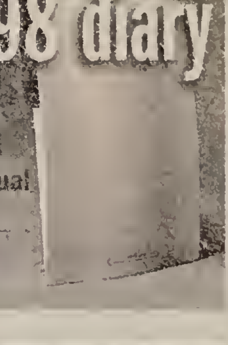
FEBRUARY 9, 1998 VOLUME 15, NUMBER 6

# NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

## Demo 98 diary



New 'Net products shined last week at annual event. Page 10.

DEMO ninety eight

# Novell faces NDS platform conundrum

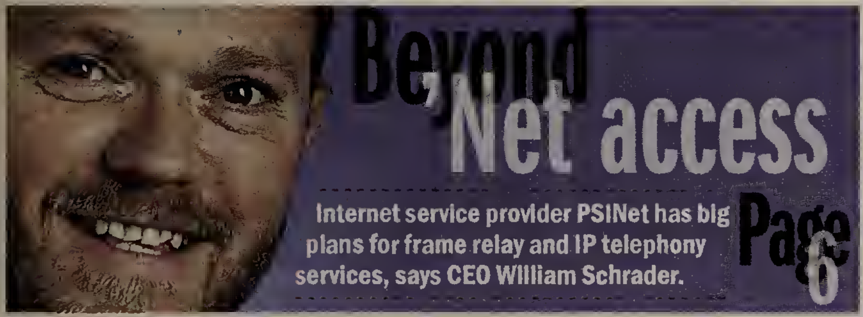
**By Christine Burns**

Faced with the reality that its cross-platform directory plans have met with tepid industry interest, Novell, Inc. is looking for a more expeditious way to pull Unix servers and mainframe systems into the NetWare fold.

The company is working on a set of Novell Directory Services (NDS) authentication modules that will let users sign on to a network once and tap into data and applications on NetWare, Unix and mainframe systems.

The plan represents an about-face for Novell, which has a

*See* **Novell,** *page 76*



## Beyond 'Net access

**Internet service provider PSINet has big plans for frame relay and IP telephony services, says CEO William Schrader.**

Page 6

# Spectrum revamp takes aim at network failures

**By Jim Duffy**

*Rochester, N.H.*

Cabletron Systems, Inc. in the second quarter will unveil a version of its Spectrum management platform that should help users recover more quickly from network failures.

Spectrum 5.0 will feature a significantly enhanced version of Cabletron's Enterprise Configuration Manager (ECM), which will allow users to store the configuration files for thousands of network devices and download the files to the devices with a few mouse clicks. This should

*See* **Spectrum,** *page 75*

# Banks test 'Net

*Big U.S. banks are teaming up to put digital certificate technology through its paces.*

**By Ellen Messmer**

Internet-based electronic commerce could get a huge boost this spring when five of the largest U.S. banks band together to test six companies' digital certificate technologies.

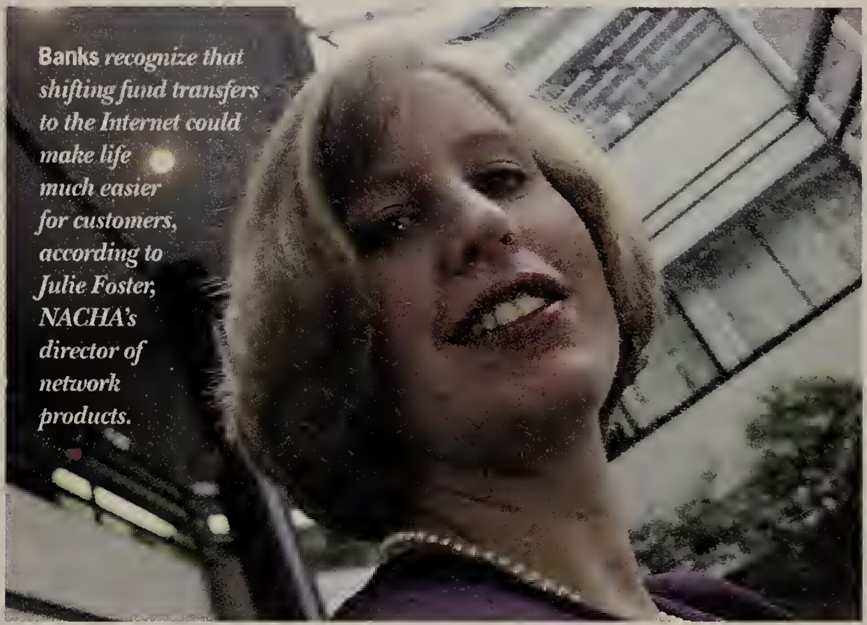
If the results are good, the banks could begin shifting billions of dollars in payment transactions onto the Internet and off of proprietary fund transfer networks such as the Automated Clearinghouse (ACH) system.

This would be welcome news for Web-based businesses, as well as corporate treasurers and purchasing departments looking to send payment and debit instructions to their banks securely over the 'Net.

Using the Internet rather than proprietary fund transfer systems would be less expensive and easier because companies could use popular Web browsers to conduct transactions rather than custom fund transfer software.

The test will focus on X.509-based digital certificates, which are essentially electronic identification cards. The certificates allow users to digitally sign electronic forms, such as payment requests, using Web browsers from the likes of Microsoft Corp. and Netscape Communications

*See* **E-comm,** *page 75*



**Banks** *recognize that shifting fund transfers to the Internet could make life much easier for customers, according to Julie Foster, NACHA's director of network products.*

STAN BAROUH

# Outsiders to do what Sun can't: Speed up Java

**By Chris Nerney**

This should be the year that Java gets up to speed.

Not content to wait for Sun Microsystems, Inc. to deliver its highly anticipated HotSpot compiling technology — now due out this summer — a number of big vendors such as IBM and relative unknowns such as Tower Technology Corp. are developing their own methods for improving Java byte-code performance.

Since its inception three years ago, slow performance has been Java's Achilles' heel. While developers and enterprise users are attracted to its cross-platform,

*See* **Java,** *page 76*

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# Long night on the net watch

*By Charles Bruno*

*Surviving a night on the graveyard shift with shipping giant CSX Corp.*

At an hour when most network personnel are in a deep sleep, Walter Snider and Willie Williams are huddled over a network management console, determined to learn why a line is down between railroad shipping giant CSX Corp.'s Jacksonville, Fla., dispatch center and a Baltimore train yard. The matter becomes more urgent when the dispatcher who called in the problem tells Snider the outage will delay trains if it's not remedied soon.

See **Net watch,** page 62

**Michael Kaiser,** Walter Snider, Willie Williams and Alvin Sutton pull an all-nighter to keep CSX's network and trains running 24x7.

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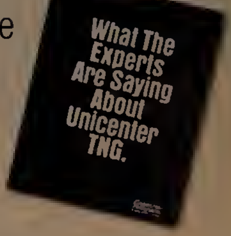

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STAN BAROUH

## IP MULTICAST MAVEN

MCI's Vinton Cerf is optimistic about IP Multicast technology. Our interview, page 41.

## XLNT ADDITION

XLNT bolsters its Gigabit Ethernet switch with an ATM module. Page 17.

## SITTING DUCKS

The Internet Mail Consortium's Paul Hoffman says most companies' SMTP servers can easily be exploited by relay spammers. Page 8.

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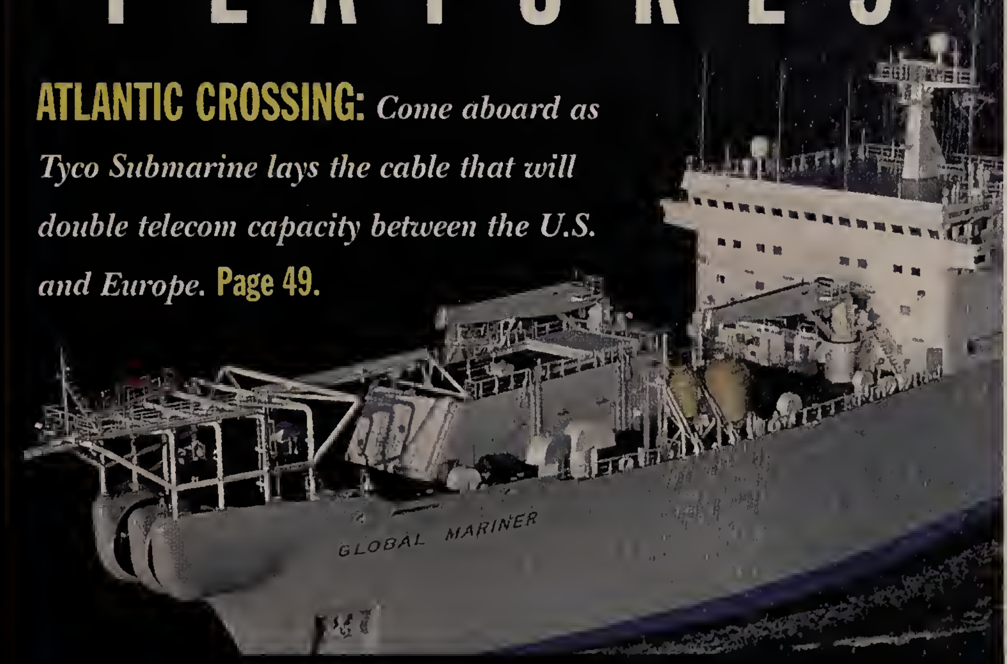

**ATLANTIC CROSSING:** *Come aboard as Tyco Submarine lays the cable that will double telecom capacity between the U.S. and Europe.* **Page 49.**

**REVIEW:** *The latest proxy servers from Netscape and Microsoft.* **Page 57.**

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### This Week

## Only on Fusion

**Macintoshes.** Our editorial last week on what Apple needs to do to bring the Mac into the network fold generated a number of responses. Read what people had to say, then add your own comments in our online conference. **DocFinder: 5733**

**Site Watch.** This week, we compare the Web sites of Oracle and Sybase. Also, we try to remain objective about the Object Management Group's site. **DocFinder: 5525**

**Online events.** There are many live broadcasts, conferences and other online events of interest to net professionals on the World Wide Web. We've set up a calendar of these events for you. **DocFinder: 5731**

**The Spectrum rollout.** Cabletron will unveil a new version of its Spectrum management platform. We've got details on the current Spectrum product online, including a link to Cabletron's Spectrum home page and articles about the product's features. **DocFinder: 5730**

**Gigabit Ethernet standard delayed.** Take this opportunity to get up to speed on the technology and its history. We've got an audio primer and links to articles for you. **DocFinder: 5732**

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## News briefs, February 9, 1998

### Nortel: Yes, we do internetworking

**Nortel EDN's** *Conner*

■ Northern Telecom, Inc. for the first time has created a business unit focused on the internetwork equipment market. The company's new Enterprise Data Networks (EDN) unit, announced last week, includes all of Nortel's traditional packet and Magellan Passport fast-packet switches, Micom access concentrators and other gear, plus security offerings from Nortel's Entrust Technologies, Inc. subsidiary. Newly appointed Nortel EDN President Bill Conner said the move should help win over prospective customers who still think of Nortel exclusively as a PBX and call center provider.

### Bay snaps up another firm

■ Bay Networks, Inc. last week announced its second acquisition in as many months when the company said it will buy network management software maker Netsation Corp. for $11.6 million. Bay's interest in the Research Triangle Park, N.C., company lies in Netsation's Network Configurator tool, which is designed to help enterprise network managers streamline their router and switch configurations. Bay last month agreed to buy remote access switch vendor New Oak Communications, Inc. for $156 million.

### BMC buys out BGS Systems

■ BMC Software, Inc. last week said it will spend $285 million to buy BGS Systems, Inc., the Waltham, Mass., maker of the Best/1 performance analysis and prediction software for Unix, Windows NT and mainframe systems. Houston-based BMC sells application and database management software called Patrol.

### 56K modem movement

■ Soon you should be able to buy 56K bit/sec modems without having to worry whether they can talk to modems at the other end of the line. Modem makers, including 3Com Corp., are scheduling interoperability tests based on a new 56K bit/sec modem standard that last week won preliminary approval from the International Telecommunication Union. Until now, there have been two competing technologies that did not work with each other. The standard is expected to win final approval in September.

### FCC rejects BellSouth bid

■ As expected, the Federal Communications Commission last week rejected BellSouth Corp.'s application to enter the long-distance market in Louisiana. The FCC previously turned down regional Bell operating company long-distance applications in Michigan, Oklahoma and South Carolina. But the key test is expected in April, when Bell Atlantic Corp. is due to file with the FCC for long-distance authority in New York, following a required review by state regulators. The New York area features dozens of local competitors, including some for residential service, a key FCC concern.

### Talkin' about Gigabit Ethernet

■ *Network World* this week (Feb. 10-12) is sponsoring the Gigabit Ethernet Conference at the Wyndham Hotel in San Jose, Calif. Among the topics of discussion is sure to be the Gigabit Ethernet Alliance's acknowledgment last week that IEEE ratification of the key 802.3z Gigabit Ethernet standard will slip to June (*NW*, Jan. 26, page 14). One highlight of the conference promises to be Tuesday's roundtable, titled "Gigabit Ethernet and ATM: Friends or Foes?" The roundtable will be held from 5 p.m. to 7 p.m. and will be hosted by *Network World* Editor in Chief John Gallant. Panelists will include representatives from 3Com Corp., Alteon Networks, Inc., FORE Systems, Inc. and Foundry Networks, Inc., among other companies. The discussion is open to all with no preregistration required. For more information on the conference, call (800) 351-6000 or (408) 526-9194.

---

# PSINet gets into frame relay game

**By Denise Pappalardo**
*Herndon, Va.*

PSINet, Inc. soon will announce services that will let business users marry frame relay and IP networks.

Through its recently inked deal with IXC Communications, Inc., PSINet will offer a single package that will let users mix frame relay and IP services between corporate offices. Typically, users must purchase these services from separate vendors.

PSINet earlier this year signed an agreement with IXC to use 10,000 miles of IXC's OC-48 fiber-optic network. In exchange, IXC got a 20% stake in PSINet.

The unnamed service will let customers who are not ready to adopt the Internet as their WAN transport system to use frame relay permanent virtual circuits (PVC) to transmit their data traffic and connect to the Internet, said Harold Wills, executive vice president and chief operating officer at PSINet.

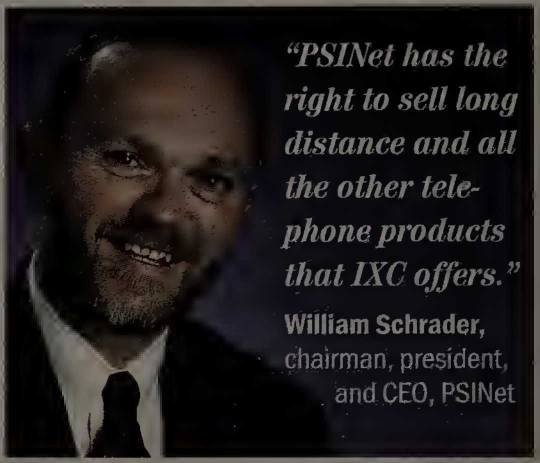
To enable the service, PSINet will connect its switches to IXC's network so the two companies will be able to interexchange traffic. PSINet will offer its customers standard frame services using PVCs and committed information rates.

PSINet also is in the early stages of developing a voice-over-IP service that is expected to offer users lower costs than those charged for conventional long-distance and international telephone calls.

"Our strategy is to compete in the Fortune 1000 arena by offering users network service packages," Wills said. Many of the larger companies have investments in legacy applications such as SNA. PSINet plans to offer broader services that will let business users migrate to IP at their own pace, Wills said.

While analysts agreed that PSINet's frame relay service has merit, the company may have a hard time selling it to users.

PSINet is seen as an Internet service provider, not as a frame relay service provider, said Rebecca Wetzel, director of Internet services at TeleChoice, Inc., a Verona, N.J.-based consulting firm.



*"PSINet has the right to sell long distance and all the other telephone products that IXC offers."*
**William Schrader,**
chairman, president, and CEO, PSINet

Services that integrate data, voice and Internet access services are particularly useful for business users, but the market has only seen these services from telephone company-based ISPs to date, she said.

For example, WorldCom, Inc. offers Intelenet, an integrated voice, data and Internet access service. It does not include frame relay support, however.

PSINet may have the right pieces to put a service like this together, but the company may have a hard time convincing users that it can provide reliable frame relay service, Wetzel said.

"Carriers that can offer multiple data networking solutions have an inherent advantage over those that cannot," said Eric Paulak, an analyst at the Gartner Group, Inc., a Stamford, Conn.-based consulting firm.

PSINet has been selling the majority of its services to small to mid-size firms that will not be as interested in bundled frame services, Paulak said.

One customer said he would not hold PSINet's ISP status against it when the company starts offering more traditional services. A Midwest securities firm user who asked not to be named said his company has been very satisfied with the security and dedicated Internet access services from PSINet that it has used for the past two years. Instead of being concerned about the source of the service, the user said he would be more interested in PSINet's reliability, redundancy and cost.

The ISP also is developing voice services. "We could deploy a product tomorrow, but we are choosing not to," said William Schrader, president and CEO of PSINet. The company is waiting for a carrier-class product that will support redundancy and toll-quality voice.

PSINet would not reveal which vendor's products it is currently testing to support its planned voice services.

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# Cisco plans Gigabit Ethernet splash

**By Jim Duffy**
*San Jose, Calif.*

Cisco Systems, Inc. this week will roll out its Gigabit Ethernet products and address how the company plans to deal with a delay in the Gigabit Ethernet standard.

The products include a new Catalyst LAN switch chassis that supports 10G to 20G bit/sec of bandwidth. Also included are Gigabit Ethernet uplinks and switching modules and a NetFlow Layer 3 switching card for the Catalyst 5X00 LAN switch line.

Additionally, Cisco will roll out Gigabit Ethernet interfaces for the Cisco 7500 series routers.

The NetFlow card is expected to forward 2 million to 3 million packet/sec. Cisco previewed all but the new switch chassis last fall at NetWorld+Interop '97.

The new Catalyst switch will be positioned between the Catalyst 5500, which sports from 3.6G to 5G bit/sec of bandwidth, and a next-generation Catalyst switch being developed under the code name Milan (*NW*, Sept. 29, 1997, page 6).

Sources last week said Milan may be an eight-slot chassis — similar to the Cisco 12008 Gigabit Switch Router to which Milan has been compared — that holds up to 48 Gigabit Ethernet ports. Milan is expected to ship in the second half of this year. Cisco would not comment on Milan.

Cisco also intends to disclose how the company plans to deal with the three-month delay in the Gigabit Ethernet standard. Last year, Cisco said it would not release products until the standard was ready.

However, a problem in running Gigabit Ethernet over multimode fiber has delayed the specification until at least June (*NW*, Nov. 10, 1997, page 1).

Pricing of the new products could not be learned by press time. ■

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# Spammers run roughshod over e-mail servers

*Internet Mail Consortium test finds interlopers can access corporate mail servers far too easily.*

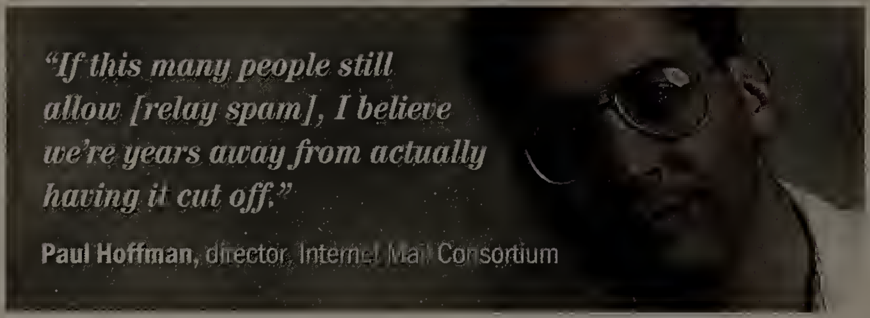
**By Paul McNamara**

Spammers are free to funnel their wares through the Internet e-mail servers of unwitting corporations largely because many networks all but put out a welcome mat for them.

A test conducted recently by the Internet Mail Consortium (IMC) showed that 57% of Simple Mail Transfer Protocol-enabled servers could be easily used by outsiders for so-called relay spamming, according to IMC Director Paul Hoffman. Relay spamming occurs when an unauthorized person uses the SMTP server of an organization to send unsolicited bulk e-mail.

Such spamming saps network resources and administrator time, and also can create a public relations problem when irate spam recipients blame the company because its domain name appears in the header of a junk e-mail message.

Although relay spamming has been a widely publicized problem for almost a year, a random test of 500 addresses culled from IMC's own mailing lists showed that less than half had taken steps to stop unauthorized SMTP relays, a result Hoffman called surprisingly low. That result also should be disappointing to those who envision employing relay blocking as a potentially decisive weapon in the war against spam, he added.



*"If this many people still allow [relay spam], I believe we're years away from actually having it cut off."*

**Paul Hoffman**, director, Internet Mail Consortium

"I would say we have to close down 99% of [all SMTP] relays to make an effective spam solution," Hoffman said. "Therefore, I am incredibly skeptical that it will work [long-term]."

Nevertheless, IMC continues to recommend limiting relay privileges to known network users whenever possible. A number of newer SMTP servers come equipped with easy-to-deploy relay controls, although safeguarding older servers can be harder, if not impossible, Hoffman said.

Not every network administrator, however, believes that the risks of spamming outweigh the benefits of SMTP relaying to legitimate users, such as those who need to send e-mail regularly from the road.

"In our university environment it is desirable to even allow unauthenticated local addresses to relay," said Craig Paul, a systems support software analyst at the University of Kansas. "Other departments here on campus that have disabled relay have found that some of their users are inconvenienced, and the users are forced to reconfigure."

Paul added that he has "locked out specific addresses when they either make us a target of a concerted spam or try to use us as a spam relay."

Even those who have attempted to cut off relay spammers at the server report less than perfect results.

"We have used [Microsoft Corp.'s] Exchange 5.5, which is supposed to eliminate the problem," said a network administrator at a 100-user California company.

Relay spamming dropped off dramatically, but "somehow there is still someone getting into our system sending out bogus messages," the network administrator said.

The administrator also has blocked a half-dozen small Internet service providers from accessing her company's e-mail server because of spam being generated from their domains.

"That's a cat-and-mouse game, because as soon as I block one it comes in from someplace else," she said. And blocking runs the risk of losing legitimate messages.

IMC intends to repeat its test periodically in order to track whether more organizations will turn to relay-blocking as a spam countermeasure. ■

# Alteon to offer multispeed Ethernet switch

**By Robin Schreier Hohman**
*San Jose, Calif.*

Alteon Networks, Inc. next week will announce a switch that can support Gigabit Ethernet, Fast Ethernet and Ethernet LANs.

**Alteon's ACEswitch 180** *is the first to deliver 10/100/1000 Ethernet ports, with a microsecond failover from Gigabit to Fast Ethernet.*

The ACEswitch 180 will let users more easily migrate from traditional Ethernet to high-speed Gigabit Ethernet LANs without having to swap out switch hardware.

The box also will switch traffic from failed links to another port, regardless of that port's speed. For example, in the case of a failed gigabit port, traffic could be switched to a 10M/100M bit/sec port in less than a second, according to Alteon.

Alteon also said the switch will feature load balancing so heavy traffic can be distributed across servers.

The ACEswitch 180 has eight dual-speed ports and eight 10/100-Base-TX and 1000Base-SX ports. Alteon said the switch will cost $1,875 per Gigabit Ethernet port. Gigabit Ethernet typically costs about $2,500 per port, though vendors have become more aggressive of late: 3Com Corp. recently announced that its Gigabit Ethernet-only SuperStack II Switch 9300 will cost $1,249 per port.

San Diego-based Qualcomm, Inc., which makes digital wireless communications products, will begin beta-testing the new Alteon switch next week. Lee Damon, an engineer who runs Qualcomm's test lab, said he cannot wait.

"I would deploy it in the computer room between all of my network appliance file servers for moving data rapidly," he said. "The idea of the automatic failover — I love it."

The ACEswitch 180 is expected to sell for $14,995. The switch is in beta tests now and will begin shipping in limited quantities in April. Alteon expects the switch to be in full production by May.

©Alteon: (408) 350-5500

# Cable vendors add security

**By Tim Greene**

Some of the biggest names in cable TV last week came to an agreement on how to secure emerging cable-based data communications services.

Tele-Communications, Inc., Time-Warner Cable, a division of Time-Warner, Inc., Cox Communications, Inc. and Comcast Corp. agreed to use dual security measures, public-key authentication and encryption from RSA Data Security, Inc.

"This will protect both cable customers and service providers from attacks," said Robert Cruickshank, project manager for telecommunications projects at Cable Television Laboratories, Inc., the research and development lab for the cable TV industry.

Customers of these new data services share a common physical cable. Because of this, data they send, and in some cases files in their own PCs, may be vulnerable to neighbors inclined to hacking (*NW*, Dec. 22, 1997, page 1).

The RSA security will help head off modification of credit and billing information, cloning and spoofing of subscriber units, interception and replay of signals, and malicious software attacks, according to Jim Bidzos, president of RSA. The security will protect audio/video programming and data.

The RSA technology will be made available to cable modem vendors that will incorporate it into modems due out later this year. ■

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# Internet and past PC leaders rule Demo 98 show

**By Doug Barney**
*Indian Wells, Calif.*

Ever wonder what yesterday's PC industry leaders are up to these days? Well, if last week's Demo 98 show was any indication, about half of them are launching Web start-ups.

The show, held near Palm Springs, Calif., attracted 800 people — including venture capitalists looking for a good buy, software entrepreneurs looking for a good idea and members of the press looking for a good story.

Bob Frankenberg was there, appearing a bit more relaxed than he did during his days as Novell, Inc.'s CEO. Now he is heading up Encanto Networks, Inc., a Santa Clara, Calif. start-up that is trying to make the posting of digital photographic images as easy as logging on to a computer.

With the help of Eastman Kodak Co., Encanto launched e.go Photo. To post a photo, a user slips the camera's flash memory card into the e.go Photo system, which is part of Encanto's low-priced, Java-based Web server. Thumbnail versions of the photos, along with instructions about how to place the photos on a Web site, immediately pop up.

One of the hotter demos was the 2Share Server from 2Bridge Software, a San Francisco-based company backed by $3 million from venture capital firm New Enterprise Associates.

The investment was spearheaded by pundit-turned-investor Stewart Alsop, who told *Network World* over dinner that last year he invested $12 million in new companies. His most noteworthy investment was in Portola Communications, Inc., which recently was acquired by Netscape Communications Corp. Unfortunately, some of the value of that deal was lost as Netscape's stock price plunged, Alsop complained.

The 2Share Server, which starts at around $45,000, runs against existing Web servers and allows end users to easily contribute to Web sites.

Although it includes authoring tools, 2Share mainly is designed to ease information distribution. For example, the software can be used by a financial analyst to produce a report in Microsoft Corp.'s Microsoft Word pro-gram and have that information automatically added to a Web site.

### Dedicated to the Web

Another show participant, Mountain View, Calif.'s Cobalt Microserver, Inc., took a few clues from Data General Corp. (DG) and introduced a dedicated Web server called Cobalt Qube. Like DG's thin servers, the Cobalt device is designed as a Web serving appliance. But unlike the DG products, Cobalt's offering is square and bright blue. The server starts at less than $1,000 and includes Apache Web server software and the Linux operating system.

**THAT'S THE NUB**

**Among the announcements at Demo 98 last week was Data General's Network Utility Box (NUB). Its features include:**

- **1M bit/sec wireless 2.4-GHz LAN interface**
- **Firewall capabilities**
- **Support of IP packet routing for eight devices**
- **Management via a Web browser**

DG showed off an unfinished but very promising product, dubbed the Network Utility Box (NUB). Designed to be placed next to a household electric utility box, the NUB would give a range of devices simultaneous access to the Internet.

PCs, for example, would connect wirelessly to the NUB, which has a 150-foot range. The NUB would decide when to dial in and hang up, in the case of a standard modem connection, or would give constant access with a nailed-up connection.

DG hopes that service providers will offer the $500 to $1,500 box much as cable companies offer cable boxes today.

Icast Corp., of Los Gatos, Calif., used the Demo 98 show to up the IP Multicast ante with its C:TV product line. The line includes a software-only approach to broadcasting video over TCP/IP networks, a real-time directory of available content, a tool to gauge bandwidth usage and software that can record video for future playback. Icast CEO Enzo Torresi also has launched Businessland, Power Computing and NetFRAME Systems, Inc.

Another cool product was shown off by StepOne of New York. Its eponymous product provides real-time updating of Web information. For instance, changes to a Word document linked to a site can be posted as they are made.

### Lotus alumni club

Ex-Lotus Development Corp. employees were in full start-up glory at Demo 98. Narrative Communications Corp., managed by at least six Lotus alumni, showed off Enliven 2.0. Originally designed to offer CD-ROM quality content over the 'Net, Enliven has been recast as a way to create banner ads that users can click on and actually buy products from. Narrative Chairman John Landry, formerly chief technology officer for Lotus and now Internet guru for IBM's executive team, was spotted heading for refreshments with a full entourage of ex- and current Lotus employees.

Also on hand was former Apple Computer, Inc. technology expert Jean-Louis Gassee. He came to observe the birth of a family of video products from Adamation, Inc., designed to run on Gassee's BeOS operating system. Be, Inc. is developing a state-of-the-art multimedia operating system.

While small companies were all the rage, Sun Microsystems, Inc. crashed the start-up party by unveiling two products. The Sun Community Server is designed to create self-running online communities. With the server, companies can create sites that include special interest groups, and can manage the contributions of Web site visitors.

Sun also displayed Persona, which for all the world looked like a big, misshapen greenish egg. This Java-based device is designed to be a phone and e-mail answering machine, allowing users to retrieve messages via the World Wide Web or a telephone. No word on when, or if, this device will actually ship.

For more information on the show, visit www.demo98.com. ■

# Document management spec ready for rollout

*FileNET and Xerox to be among first with DMA-compliant products.*

**By Paul McNamara**

The Document Management Alliance (DMA) this week will announce that its members have unanimously approved a new set of standard APIs designed to give users single-client access to different vendors' document servers.

If widely adopted, DMA 1.0 will help companies connect the islands of information they now have stored in incompatible document repositories.

Among the cross-platform tasks DMA 1.0 will enable are a mechanism for locating document repositories, version control and the recognition of common attributes that carry different labels in different document repositories, such as "name," "author" and "writer."

DMA, a coalition of 50 vendors and large users, has been working for 2 1/2 years on this specification.

FileNET Corp., Xerox Corp., and Napersoft, Inc. will be the first vendors to announce specific plans to ship DMA 1.0-enabled products. The products are expected to roll out between now and year-end.

Customers and industry analysts last week said the developments hold great potential for expanding the use and value of document management software. But they cautioned against unbridled enthusiasm until vendors actually start delivering DMA-compliant goods that interact.

DMA-enabled clients and servers will connect through middleware to grant users access to repositories that would otherwise be accessible only through proprietary clients or customized APIs.

One user whose company was involved in the DMA development process believes the initiative's success or failure will hinge on how much pressure vendors feel from their customers.

"If there is user demand for this technology, then obviously the vendors will have to fall in line if they want to play the game," said Benton Org, senior principal scientist at The Boeing Co., in Seattle.

As for those vendors that decide to stick by their proprietary guns?

"I don't want to say that they're in or out [of Boeing]," Org said. "I *would* say that when we start selecting products, [DMA support] is one of the primary considerations." ■

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For the answer to this week's question and more net trivia, **visit Network World Fusion** and enter **2349** in the DocFinder box.

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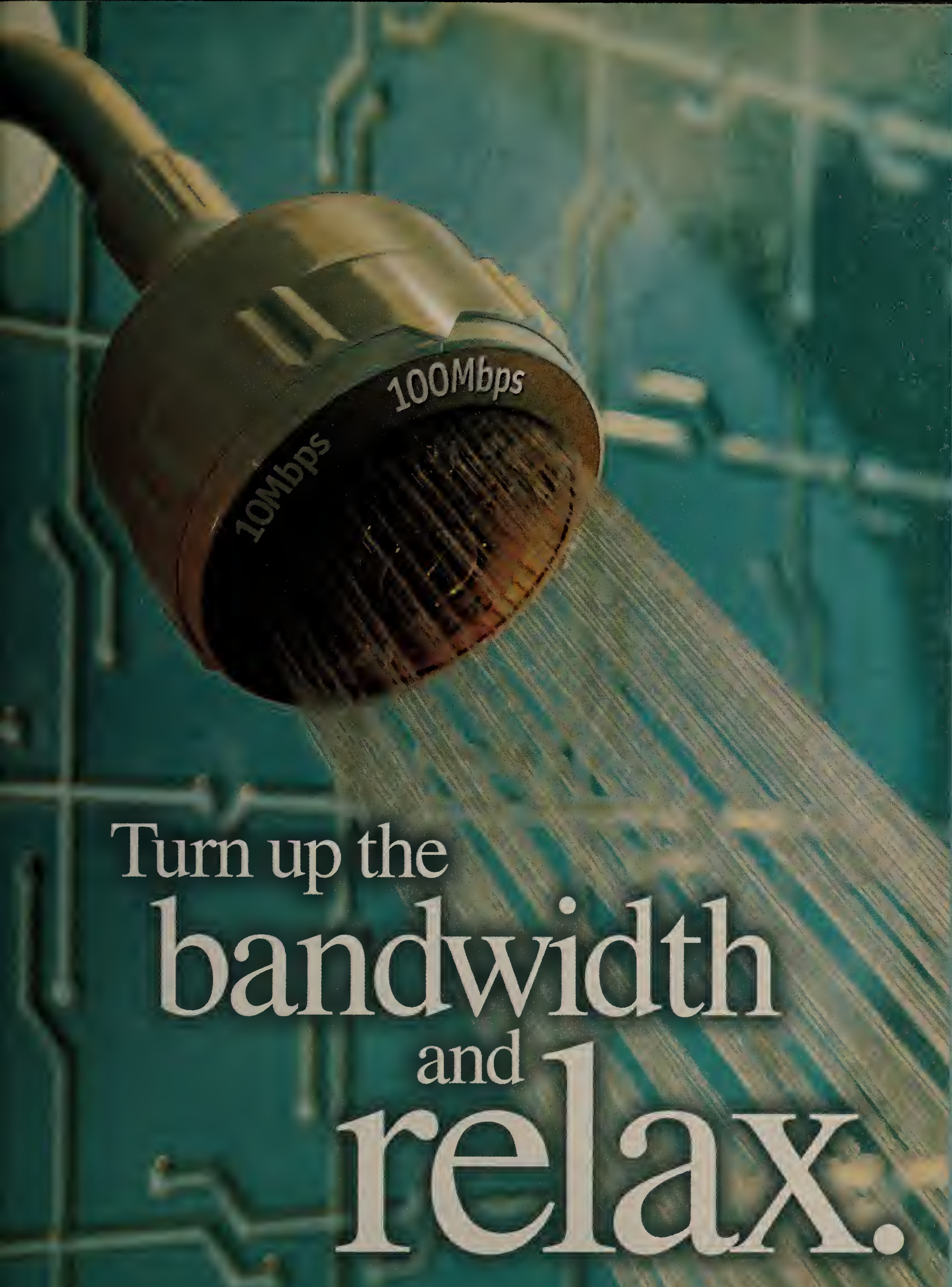
This week's question:

**Network management vendor BMC Software last week made news by agreeing to buy BGS Systems for $285 million. What does the acronym BMC stand for?**



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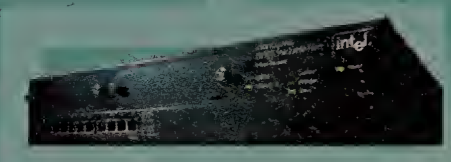

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# Microsoft software eases Windows mgmt.

**By Christine Burns**
*Redmond, Wash.*

Microsoft Corp. last week released beta code for its next-generation NT-based systems management software aimed at making Windows desktops and servers easier to manage.

Formerly code-named Opal, this first public beta of Systems Management Server (SMS) 2.0 includes upgraded software distribution services, new software metering wares and physical network management capabilities.

### SMS 2.0 BETA FEATURES

- Synchronized SMS 2.0 and SQL Server install
- New interface runs as a snap-in for Microsoft Management Console
- Autodiscovery tools for software inventory
- New network topology tracing tool
- More delivery options for software distribution

Additionally, the new user interface for SMS 2.0 is a snap-in to the Microsoft Management Console (MMC), a single NT-based console Microsoft has built to house all Windows-based management tools. The goal of the MMC is to give a network manager a single place to access all administration tools.

Beta tester Jon Lonoff, vice president of Bankers Trust Corp.'s information services in New York, said he was most pleased with SMS 2.0's improved software distribution.

The beta lets an administrator distribute software to single users, groups of users, TCP/IP network segments or specific machines. It also has a feature which automatically pushes necessary software out to new users in specified groups such as the marketing department or NT administrators. Another feature allows a network manager to prioritize software updates.

"I have a lot more options now as far as when and what I can push down to the desktop machines," Lonoff said.

SMS 2.0 also has the capability to autodiscover software running on distributed desktop machines. While this may be useful in the future, Lonoff said Microsoft needs to work on better grouping software components for a more accurate reading of applications. For example, since NT 4.0 contains some NT 3.51 files, the tool reported back to Lonoff that a single workstation was running both versions of the operating system.

The beta also offers new physical network management features such as a topology tracing tool that provides a graphical display of the routes and network devices such as hubs, switches and routers located between servers. A new software metering tool tracks all applications on local and remote client and server machines.

Microsoft originally had planned to release SMS 2.0 last summer, but analysts say the company needed time to determine where SMS fit into its growing list of management initiatives.

This is the first version of SMS that fits into Microsoft's 18-month-old Zero Administration Windows (ZAW) initiative.

ZAW defines how Microsoft promises to reduce the cost of owning and managing large groups of PCs via integrated management capabilities. For example, all of the new SMS system managability features will be built into Windows 98 and NT 5.0 later this year.

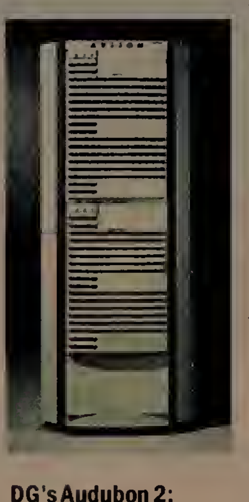
However, the product still lacks some much needed cross-platform support. But Microsoft said support for 16-bit Windows and non-Windows clients will be added to SMS 2.0 in a second beta cycle planned for this spring.

That release will offer some integration with Novell, Inc. NetWare servers. This will let SMS 2.0 tap into Novell Directory Services for information about users, which will help facilitate software distribution processes, said Kevin Kean, Microsoft group product manager. ■

# New Data General server targets warehouse, Java apps

**By Marc Songini**
*Westboro, Mass.*

Data General Corp. (DG) today will announce a Non-Uniform Memory Access (NUMA) server that boasts twice as many processors as the company's previous top-of-the-line model.



**DG's Audubon 2:**
*Double the processors*

The Audubon 2 version of DG's AV 20000 server sports 64 333-MHz Intel Corp. Deschutes chips, and can link up to four servers to form a cluster of 256 processors.

The Unix-based machines are designed to host processing-intensive applications such as data warehouses. The servers also will be able to run Java programs, the result of new Java development tools included in DG/UX, DG's version of Unix.

DG is one of a handful of companies pushing the NUMA server architecture, under which processors share a virtual memory rather than a fixed memory bus. According to NUMA advocates, the architecture offers the power of symmetric multiprocessing but its performance scales more linearly as processors are added.

A single Audubon 2 will support as much as 64G bytes of memory and 400 terabytes of storage running through 144 I/O ports.

Users of existing AV 20000 servers will be able to upgrade to the Audubon 2 architecture, according to the company.

The new server will ship later this year. Pricing has not been announced.

©DG: (508) 898-5000

# Wireless savings abound

*New wireless services promise savings, advanced features.*

**By Denise Pappalardo**
*Herndon, Va.*

If you have not yet negotiated a companywide contract for your wireless services, it may be time to make a deal.

Personal Communications Service (PCS) network installations are increasing. And if lower rates, more flexible contracts and advanced features are appealing to your business, then you should check out PCS.

"Business users have to look at PCS," said Simon Reeves, senior communications analyst with Decision Resources, Inc., a Waltham, Mass.-based consulting firm. When users see what PCS carriers are offering, they will find deals and savings that they cannot get from cellular and digital cellular carriers, he said.

"Users [can] sign contracts that guarantee the service rates they are paying today until the year 2002, but also guarantee a way out of the contract with little or no penalty," Reeves said. "Buyers have the upper hand."

Users who have taken advantage of PCS are singing its praises.

"One of the reasons why we chose digital PCS initially was because we were impressed with the features," said Ben Omar Arrington, manager of the organ preservation unit at New York Hospital Cornell Medical Center, in New York. The medical center uses Omnipoint Communications, Inc.'s PCS offering. "We had analog phones and separate pagers, and now everything's integrated into one handset," Arrington said.

Not only do PCS features beat the analog cellular services Arrington's unit was using from AT&T Wireless, he also has cut costs. "We are saving 25% on our monthly bill compared to the [cellular] minutes we used in previous years," Arrington said.

### ANALOG CELLULAR VS. PCS

**Wireless digital services offer users features and contract flexibilities that are not found with traditional analog services.**

| | Analog cellular | PCS/Digital cellular |
|---|---|---|
| **Service contracts** | One year or more | Less than one year |
| **Phone prices** | Basic phones are free or less than $50 | $200 or more |
| **Incoming calls** | Wireless user pays | One minute free, moving to caller pays |
| **Air time rates** | Cost differs by time of day | Flat rate per minute regardless of time |
| **Voice mail** | Yes | Yes |
| **Call waiting and/or caller ID** | Limited | Standard |
| **Short messaging e-mail** | Not generally available | Optional |

SOURCE: DECISION RESOURCES, WALTHAM, MASS

The hospital also was able to save an additional 25% by eliminating a separate answering and paging service it was using.

Other users also have found good rates when signing high-volume contracts. VHA, Inc., a health care provider consortium, late last year inked a contract with Sprint PCS that initially covered 1,000 phones.

"This is our first national agreement for wireless services," said Mike Hasselle, senior product manager at the Irvine, Texas-based VHA. He expects that users' bills will be 60% to 70% lower than their current analog rates.

The health care organization may add 30,000 to 50,000 wireless phones in the next couple of years, Hasselle said.

VHA negotiated agreements with several major carriers, including AT&T Wireless, US WEST, Inc., SBC Communications, Inc., BellSouth Corp., PrimeCo Personal Communications L.P. and Bell Atlantic Corp. before deciding on Sprint.

Sprint PCS demonstrated the most flexibility and the best overall package, according to Hasselle. "Sprint's network covers 80% of the U.S., they are using CDMA [Code Division Multiple Access] and we liked their billing plan," he said. CDMA is a digital wireless technology.

Sprint also was the only company that would sign a contract under which each subscriber is liable for the phone and bill, Hasselle said. All of the other providers wanted VHA to be liable.

Favorable contracts and cost savings have also won over other users. Tech Group, Inc., a Scottsdale, Ariz.-based plastics company, signed up for AT&T Wireless' PCS offering last August, said Pinar Tashman, a financial analyst at the company.

*See* **PCS**, *page 75*

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# Surprise IP address system test creates a stir

**By Sandra Gittlen**

It was just a test.

Jon Postel, who is responsible for assigning IP addresses and Internet domain names, is being questioned after he recently wrested control of the Internet's global address network. Postel's goal was to test how easily management of the network could be transferred from one machine to another.

Postel, leader of the Internet Assigned Numbers Authority (IANA), redirected traffic from the government's master domain name server to his own machine.

Although he was successful, had the test gone awry it could have brought down much of the Internet. Some in the Internet community also expressed concern over the ease with which one person was able to take control of a key part of the Internet, even if only temporarily.

The global address network he took control of comprises the government's master server, Root Server A, which is run by Network Solutions, Inc. (NSI), in Herndon, Va., and 12 other root servers around the world that receive updates about domain name additions from Root Server A. The servers are accessed each time a user enters a URL because the URL contains the IP address that matches the domain name.

Postel, the accepted domain name authority in the Internet community, told the operators of the other root servers to reconfigure their files to point to his machine at IANA instead of Root Server A as part of what he called a test.

"Had it gone wrong, it could have thrown the whole Internet off," said Richard Sexton, a Domain Name System consultant and technologist in Ontario. "The government allowed him to save face by saying it was a test."

"Postel [conducted the test] entirely without authority and only stopped with strong comments from the U.S. government," said Karl Denninger, who runs MCSNet, a Chicago-based Internet service provider. "He ought to be investigated and if [his actions] are found to be illegal, he should be convicted and sent to jail."

Becky Burr, a senior official with the U.S. Department of Commerce, confirmed that the government did not know of the test beforehand. Postel did not stop the test until the government asked him to, she said.

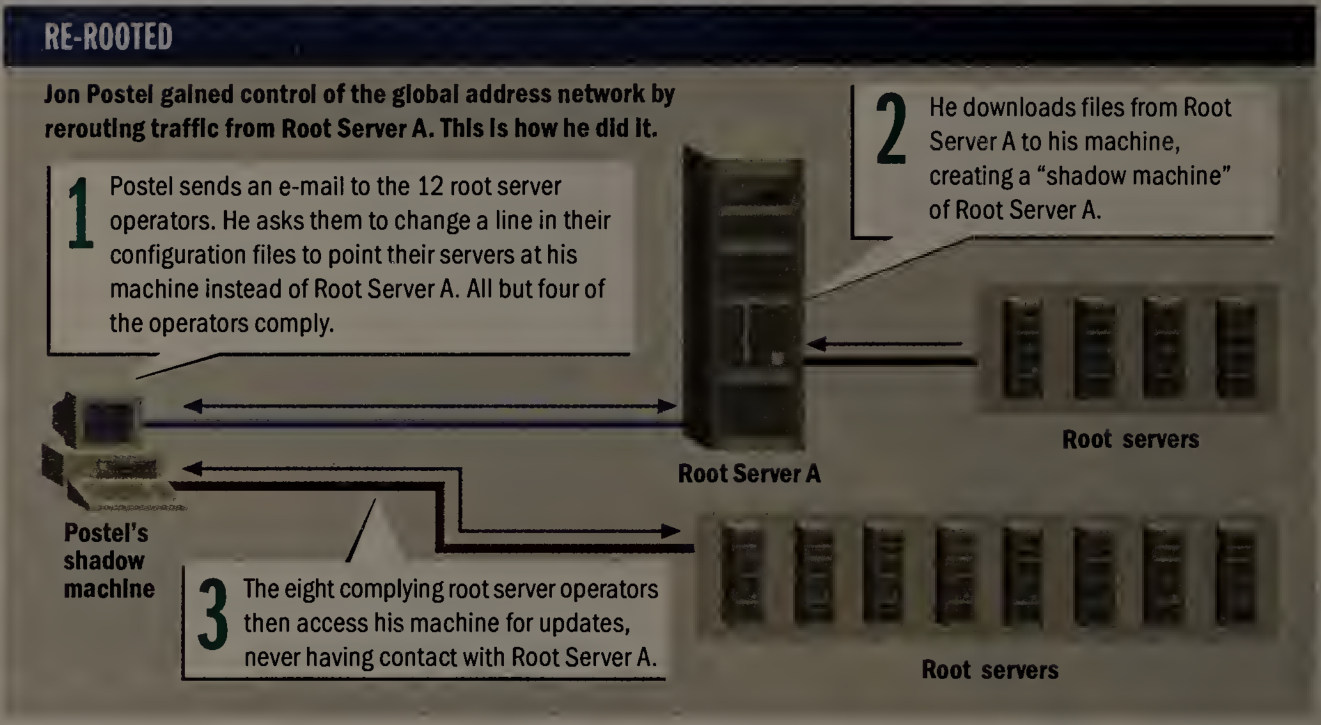
But Burr added that nothing had been harmed, and Postel "assured the government that everything would be returned to normal." She attributed Postel's actions to the fact that he is "used to having latitude." Ira Magaziner, President Clinton's top Internet adviser, said he trusts Postel will consult the government in the future.

Some members of the Internet community claim this latitude will be stripped away with the approval of the government's recently released domain system overhaul plan. They believe this prompted Postel's actions. Under the plan, IANA would be folded into a nonprofit corporation, and Postel, who has always been allowed to act independently, would report to that corporation's CEO.

Postel defended his actions in a written statement, saying that he was merely preparing for the transfer of authority of Root Server A from NSI.

Postel last month asked NSI for permission to conduct the test. However, NSI said it needed official clearance from the government before allowing the test.

Postel performed the test without that clearance, said Dave Holtzman, senior vice president of engineering at NSI. ■



RE-ROOTED

**Jon Postel gained control of the global address network by rerouting traffic from Root Server A. This is how he did it.**

1 Postel sends an e-mail to the 12 root server operators. He asks them to change a line in their configuration files to point their servers at his machine instead of Root Server A. All but four of the operators comply.

2 He downloads files from Root Server A to his machine, creating a "shadow machine" of Root Server A.

3 The eight complying root server operators then access his machine for updates, never having contact with Root Server A.

# Developers prep for Netscape code giveaway

*But many questions exist about what the software license will require of developers.*

**By Andy Eddy**

*Mountain View, Calif.*

Netscape Communications Corp.'s recently announced plan to release its client source code to the developer community has lots of programmers around the globe getting ready for the challenge.

The company this quarter will make the code for its Communicator 5.0 suite publicly available for modification and enhancement, a move Netscape hopes will help it regain momentum in the Web browser and server markets (*NW*, Jan. 26, page 1).

But questions linger about just what Netscape means by "free" source code. Does Netscape simply mean that the software will be free of cost, or does the company mean that those who alter the code have the freedom to distribute it as they choose? Some free-software licenses specify that any modifications must be made available for public use.

Richard Stallman, president of the Free Software Foundation and founder of the GNU Not Unix project, is familiar with this dichotomy. He authored the GNU general public license (GPL) that is used by many free-software developers. "There's a certain fundamental definition of what it means to be free software. [There's] a requirement that yes, you can make and distribute a modified version, but you have to put a different name on it," Stallman said.

Netscape has not yet made public the licensing scheme that it will use for its source code, but some developers are hoping that the company will go with a less restrictive scheme than a GPL-style one. Many of these developers prefer what is called a Berkeley Style Distribution license, which enables people or companies to update free source code without having to turn the fruits of their labor over to the masses.

Sameer Parekh, president of C2Net Software, Inc., in Oakland, Calif., works extensively with free software. The company's Stronghold product is a version of the freely available Apache Web server that features an enhanced cryptography implementation. He said the level of support Netscape will get for its source code depends heavily on the license the company chooses.

"A GPL license will make it hard to get third-party developers to work on [Communicator]. [Netscape is] better off using an open license that allows people to use the code any way they like, as long as they credit where it came from," Parekh said.

He noted that if the license is liberal enough, a company could use Netscape's code to create a custom application for a particular audience, in the same way that his company has adapted Apache into the specialized Stronghold. Netscape's code could become the core code for browsers, Parekh stated, much as Berkeley Internet name daemon is a free domain name server program that has been widely used in operating systems.

The question of source code size also is an issue. Observers estimated that Netscape's code will range from 20M to 100M bytes. The company still is trying to determine what parts of its code can and cannot be released to the public. For instance, cryptography is an element that will not be released, given certain export restrictions.

The size of the source code could limit who works on modifications, according to Bob Weiner, CEO of Altrasoft, Inc., a San Jose, Calif., productivity software maker. "It'll require a certain size company for people to work with code of this size," assuming the code will be at least 20M bytes, he said.

Regardless of the methodology Netscape uses to oversee its source code distribution, developers already are getting a flow of information going. Jim Cape, president of James Cape Interactive, is tracking ideas from the developer community at www.jcinteractive. com/nswishlist/index.shtml. Another organization, Openscape Group, has set up a wish list (www.openscape.org/wish.html) as well as a discussion group and announcement mailing lists. ■

## Rumors rock Netscape stock

Netscape Communications Corp.'s stock last week made a sharp rise on speculation that all or part of the company might be up for sale.

Various media sources reported that Netscape has had talks with potential buyers, including America Online, Inc., IBM, Oracle Corp. and Sun Microsystems, Inc. Neither Netscape nor the others would comment on the rumors.

Still, the speculation was strong enough to drive Netscape's stock from 16 at the start of the week to as high as 23 during Thursday's trading. The stock closed Thursday at 21 15/16.

— *Andy Eddy*

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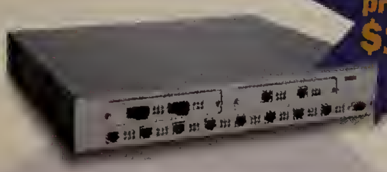

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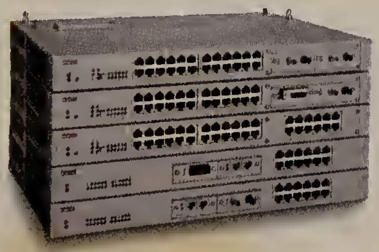

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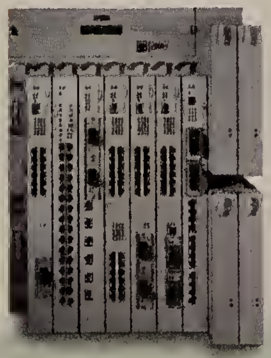

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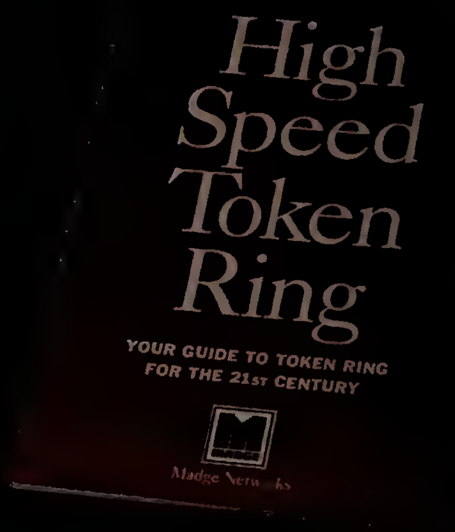

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Form: 9703

## 1 What is the principal business activity at your location? (check one only)

- 01. ☐ Manufacturing (other)
- 02. ☐ Finance/Banking
- 03. ☐ Insurance/Real Estate/Legal
- 04. ☐ Health Care Services
- 05. ☐ Hospitality/Entertainment/Recreation
- 06. ☐ Media/TV/Cable/Radio/Print
- 07. ☐ Retail/Wholesale Trade/Business Services
- 08. ☐ Transportation
- 09. ☐ Utilities
- 10. ☐ Education
- 11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
- 12. ☐ Government (Federal/State/Local)
- 13. ☐ Military
- 14. ☐ Aerospace
- 15. ☐ Consulting (Independent)*
- 16. ☐ Carriers/Interconnects
- 17. ☐ Internet Service Provider (ISP)
- 18. ☐ Manufacturing (Computer/Communications/OEM)
- 19. ☐ Resellers of Computer/Network Products (VARs, VADs)
- 20. ☐ Systems/Network Integrators*
- 21. ☐ Distributors (Computer/Communications)*
- 22. ☐ Other *(please specify)*____________

***Please complete form based on largest client.**

## 2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

- 1. ☐ Network Management
- 2. ☐ LAN Management
- 3. ☐ Datacom/Telecom Management
- 4. ☐ IS, IT, MIS, CIO, Systems Management
- 5. ☐ Internet/Intranet Management/Webmaster
- 6. ☐ Engineering Management
- 7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
- 8. ☐ Consultant (Independent)
- 9. ☐ Other *(please specify)*____________

## 3 What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please **print** the appropriate **number code** in the box next to each product category. Please complete ALL categories A-M.)

- 9. $100 Million or More
- 0. $50 Million to $99.9 Million
- 2. $25 Million to $49.9 Million
- 3. $10 to $24.9 Million
- 4. $1 to $9.9 Million
- 5. $100,000 to $999,999
- 6. $50,000 to $99,999
- 7. Under $50,000
- 8. None of the above

| | | | | | |
|---|---|---|---|---|---|
| A | ☐ | Large Systems *(Mainframes/Minis)* | H | ☐ | Internet |
| B | ☐ | Desktops *(Micros/Laptops/Workstations)* | I | ☐ | Intranet |
| C | ☐ | Servers | J | ☐ | Remote Access |
| D | ☐ | LANs | K | ☐ | Peripherals |
| E | ☐ | WAN Equipment | L | ☐ | Software |
| F | ☐ | Carrier Services | M | ☐ | Service/Support |
| G | ☐ | Internetworking | | | |

## 4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 2. ☐ 50 - 99 3. ☐ 20 - 49 4. ☐ 10 - 19 5. ☐ 2 - 9 6. ☐ 1 7. ☐ None

## 5 What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization? (Check one box in each column)

| SERVERS At Location A | | SERVERS Entire Org. B | CLIENTS At Location C | | CLIENTS Entire Org. D | LANS At Location E | | LANS Entire Org. F |
|---|---|---|---|---|---|---|---|---|
| ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ |
| ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ |
| ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ |
| ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ |
| ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ |
| ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ |
| ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ |
| ☐ | 8. none | ☐ | ☐ | 8. none | ☐ | ☐ | 8. none | ☐ |

## 6 What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)

- 1. ☐ Corporate/Enterprise
- 2. ☐ Department
- 3. ☐ None

B. Involvement (check ALL that apply)

- 1. ☐ Create Network Strategy
- 2. ☐ Recommend/Specify
- 3. ☐ Approve
- 4. ☐ Evaluate
- 5. ☐ Determine the need
- 6. ☐ None

## 7 What is the estimated number of employees at your location/in entire organization? (check one in each section)

A. At your location:

- 1. ☐ Over 20,000
- 2. ☐ 10,000 - 19,999
- 3. ☐ 5,000 - 9,999
- 4. ☐ 2,500 - 4,999
- 5. ☐ 1,000 - 2,499
- 6. ☐ 500 - 999
- 7. ☐ 499 or less

B. Entire organization:

- 1. ☐ Over 20,000
- 2. ☐ 10,000 - 19,999
- 3. ☐ 5,000 -9,999
- 4. ☐ 2,500 - 4,999
- 5. ☐ 1,000 - 2,499
- 6. ☐ 500 - 999
- 7. ☐ 499 or less

## 8 Please indicate the products/services that you are currently involved in purchasing or plan to purchase: (Check ALL that apply)

**A. Currently involved in purchasing** **B. Plan to purchase**

INTERNET/INTRANET

A B

- ☐ 01. ☐ Internet Services
- ☐ 02. ☐ Firewalls/Security/Encryption
- ☐ 03. ☐ Internet Web Servers
- ☐ 04. ☐ Intranet Web Servers
- ☐ 05. ☐ TCP/IP Software
- ☐ 06. ☐ Management/Monitoring Software
- ☐ 07. ☐ Push Technology
- ☐ 08. ☐ Web Browsers
- ☐ 09. ☐ Intranet Applications/Groupware
- ☐ 10. ☐ Search/Retrieval Products (web crawler)
- ☐ 11. ☐ Internet Development Tools (JAVA, ActiveX, etc.)
- ☐ 12. ☐ Electronic Commerce Tools
- ☐ 13. ☐ Internet Telephony

LOCAL-AREA NETWORKS

A B

- ☐ 14. ☐ Local-Area Networks
- ☐ 15 ☐ Network Operating System Software
- ☐ 16. ☐ Servers
- ☐ 17. ☐ Print Servers
- ☐ 18. ☐ ATM Switches
- ☐ 19. ☐ Token-Ring Switches
- ☐ 20. ☐ Ethernet Switches
- ☐ 21. ☐ Fast Ethernet
- ☐ 22. ☐ Gigabit Ethernet
- ☐ 23. ☐ IP Switches
- ☐ 24. ☐ LAN Storage/Backup
- ☐ 25. ☐ Optical LAN Storage/Backup
- ☐ 26. ☐ Disk LAN Storage/Backup
- ☐ 27. ☐ Tape LAN Storage/Backup
- ☐ 28. ☐ RAID LAN Storage/Backup
- ☐ 29. ☐ Network Test/Diagnostic Tools
- ☐ 30. ☐ Cables, Connectors, Baluns
- ☐ 31. ☐ UPS
- ☐ 32. ☐ Network Interface Cards
- ☐ 33. ☐ SNMP Network Management

INTERNETWORKING

A B

- ☐ 34. ☐ Routers
- ☐ 35. ☐ Hubs
- ☐ 36. ☐ Intelligent Hubs
- ☐ 37. ☐ Stackable Hubs
- ☐ 38. ☐ Bridge/Router
- ☐ 39. ☐ Bridges
- ☐ 40. ☐ Gateways
- ☐ 41. ☐ Concentrators/Repeaters

COMPUTERS/PERIPHERALS

A B

- ☐ 42. ☐ Network Computers
- ☐ 43 ☐ Laptops/Notebooks/Sub-Notebooks
- ☐ 44. ☐ Micros/PCs
- ☐ 45. ☐ Minis
- ☐ 46. ☐ Mainframes
- ☐ 47. ☐ Workstations
- ☐ 48. ☐ Printers/Network Printers
- ☐ 49. ☐ CD-ROM
- ☐ 50. ☐ Fax/Modem Boards
- ☐ 51. ☐ Graphics/Multimedia/Audio/Video Boards
- ☐ 52. ☐ Memory/Chips/Boards/Cards

REMOTE/WIRELESS COMPUTING

A B

- ☐ 53. ☐ Remote Access Products
- ☐ 54. ☐ Remote Access Services
- ☐ 55. ☐ PDAs
- ☐ 56. ☐ PCMCIA Devices
- ☐ 57. ☐ Wireless Data Services
- ☐ 58. ☐ Wireless Data Equipment
- ☐ 59. ☐ Cellular Equipment & Services

SOFTWARE/APPLICATIONS

A B

- ☐ 60. ☐ Network Management
- ☐ 61. ☐ Systems Management
- ☐ 62. ☐ Security
- ☐ 63. ☐ Communications Software
- ☐ 64. ☐ Terminal Emulation
- ☐ 65. ☐ Operating Systems
- ☐ 66. ☐ Applications Development Tools
- ☐ 67. ☐ Database Management/RDBMS
- ☐ 68. ☐ Groupware
- ☐ 69. ☐ Workflow
- ☐ 70. ☐ EDI
- ☐ 71. ☐ E-mail
- ☐ 72. ☐ Desktop Video Conferencing
- ☐ 73. ☐ Imaging
- ☐ 74. ☐ Suites/Server Suites (Back Office, etc.)
- ☐ 75. ☐ Middleware
- ☐ 76. ☐ Document Management
- ☐ 77. ☐ Site Metering Tools
- ☐ 78. ☐ Computer Telephony Integration (CTI)
- ☐ 79. ☐ Data Warehousing

WIDE-AREA NETWORK EQUIPMENT & SERVICES

A B

- ☐ 80. ☐ Modems
- ☐ 81. ☐ Asynchronous Transfer Mode (ATM)
- ☐ 82. ☐ Frame Relay Equipment/Services
- ☐ 83. ☐ ISDN Equipment & Services
- ☐ 84. ☐ FT-1/T-1/T-3 Multiplexers/Services
- ☐ 85. ☐ DSL Services/Products
- ☐ 86. ☐ SONET
- ☐ 87. ☐ Inverse Multiplexers
- ☐ 88. ☐ SMDS
- ☐ 89. ☐ Diagnostic/Test Equipment
- ☐ 90. ☐ DSU/CSU
- ☐ 91. ☐ VSAT/Satellite
- ☐ 92. ☐ PBXs
- ☐ 93. ☐ Voice Mail/Response
- ☐ 94. ☐ Videoconferencing
- ☐ 95. ☐ Leased Lines
- ☐ 96. ☐ Switched Data
- ☐ 97. ☐ Virtual Networks
- ☐ 98. ☐ Outsourcing/Systems Integration Services
- ☐ 99. ☐ Education/Training Services

- ☐ 00. ☐ None of the above (1 - 99)

## 9 Please indicate the platforms that are currently installed/planned:

(Check ALL that apply) **A. Currently installed** **B. Planned for purchase**

NETWORK PROTOCOLS

A B

- ☐ 01. ☐ TCP/IP
- ☐ 02. ☐ IPv6
- ☐ 03. ☐ SNA
- ☐ 04. ☐ DECnet
- ☐ 05. ☐ Novell IPX/SPX
- ☐ 06. ☐ APPC/APPN/LU 6.2
- ☐ 07. ☐ NETBIOS
- ☐ 08. ☐ AppleTalk
- ☐ 09. ☐ NFS
- ☐ 10. ☐ Other *(please specify)*____________

LAN ENVIRONMENT

A B

- ☐ 11. ☐ Gigabit Ethernet
- ☐ 12. ☐ Switched Ethernet
- ☐ 13. ☐ Fast Ethernet (100 Megabit Ethernet)
- ☐ 14. ☐ Ethernet
- ☐ 15. ☐ ATM
- ☐ 16. ☐ Token Ring/Token Ring Switching
- ☐ 17. ☐ IP Switching
- ☐ 18. ☐ FDDI
- ☐ 19. ☐ 100Base-T
- ☐ 20. ☐ 10Base-T
- ☐ 21. ☐ LocalTalk
- ☐ 22. ☐ Fibre Channel
- ☐ 23. ☐ 100vg Any LAN
- ☐ 24. ☐ Other *(please specify)*____________

NETWORK OPERATING SYSTEM

A B

- ☐ 25. ☐ Windows NT
- ☐ 26. ☐ Windows NT/Advanced Server
- ☐ 27. ☐ Novell IntranetWare
- ☐ 28. ☐ Novell (NetWare 4.X)
- ☐ 29. ☐ Novell (NetWare 2.X, 3.X)
- ☐ 30. ☐ Microsoft (LAN Manager)
- ☐ 31. ☐ LocalTalk (AppleTalk)
- ☐ 32. ☐ Banyan (VINES)
- ☐ 33. ☐ IBM (LAN Server)
- ☐ 34. ☐ Artisoft (LANtastic)
- ☐ 3S. ☐ Other *(please specify)*____________

COMPUTER OPERATING SYSTEM

A B

- ☐ 36. ☐ NT Server
- ☐ 37. ☐ NT Workstation
- ☐ 38. ☐ Unix/Xenix/AIX
- ☐ 39. ☐ Solaris
- ☐ 40. ☐ Windows
- ☐ 41. ☐ Windows 95
- ☐ 42. ☐ Windows 97
- ☐ 43. ☐ DOS
- ☐ 44. ☐ OS/2/OS/2 Warp
- ☐ 45. ☐ IBM MVS/VM/VSE
- ☐ 46. ☐ Digital VMS
- ☐ 47. ☐ Macintosh
- ☐ 48. ☐ Other *(please specify)*____________

- ☐ 49. ☐ None of the above (1-48)

## 10 Which of the following Servers/Clients do you have installed/planned at your location? (check ALL that apply in each column)

| | A. Servers | | B. Clients | | A. Servers | | B. Clients |
|---|---|---|---|---|---|---|---|
| Power PC | ☐ | 01. | ☐ | 486 | ☐ | 07. | ☐ |
| Power Mac | ☐ | 02. | ☐ | 386 | ☐ | 08. | ☐ |
| Mac Other | ☐ | 03. | ☐ | 286 | ☐ | 09. | ☐ |
| Multiprocessor Servers | ☐ | 04. | ☐ | Risc | ☐ | 10. | ☐ |
| PG/PII | ☐ | 05. | ☐ | Alpha | ☐ | 11. | ☐ |
| Pentium/Pentium Pro | ☐ | 06. | ☐ | Other | ☐ | 12. | ☐ |

## 11 Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale) Installed/Planned

- 1. ☐ IBM
- 2. ☐ Amdahl
- 3. ☐ Cray
- 4. ☐ Hitachi
- 5. ☐ Unisys
- 6. ☐ Other ____________

B - Minis (Midrange) Installed/Planned

- 1. ☐ IBM RS6000
- 2. ☐ IBM AS400
- 3. ☐ Digital
- 4. ☐ Tandem
- 5. ☐ Unisys
- 6. ☐ AT&T GIS
- 7. ☐ H-P
- 8. ☐ Data General
- 9. ☐ Other ____________

C - Workstations Installed/Planned

- 1. ☐ Sun Microsystems
- 2. ☐ Silicon Graphics
- 3. ☐ Digital
- 4. ☐ H-P
- 5. ☐ IBM
- 6. ☐ Other ____________

## 12 What is the estimated gross annual revenue of your entire company/institution? (check one only)

- 01. ☐ $20 billion or more
- 02. ☐ $10 billion to $19.9 billion
- 03. ☐ $1 billion to $9.9 billion
- 04. ☐ $500 million to $999.9 million
- 05. ☐ $100 million to $499.9 million
- 06. ☐ $50 million to $99.9 million
- 07. ☐ $10 million to $49.9 million
- 08. ☐ $5 million to $9.9 million
- 09. ☐ $4.9 million or less
- 10. ☐ None of the above

## 13 For which areas outside of North America do you have purchase influence? (check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia S. ☐ Middle East 6. ☐ None

B298

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# Local Networks

**Covering:** LAN Hubs, Switches and Management • Operating Systems • Servers • Thin Clients

## Briefs

■ **FORE Systems, Inc.** *has named* **Thomas Gill,** *previously the company's chief operating officer, as president and CEO. Gill replaces Eric Cooper as CEO, though Cooper will remain FORE's chairman. Gill replaces Onat Menzilcioglu as president, but Menzilcioglu will remain on the ATM and Ethernet switch company's board. Gill has been with FORE since 1993.*

**FORE's** *Gill*

*FORE also recently announced revenue for its third quarter, ended Dec. 31, 1997, of $122.1 million, a slight increase from the $112.6 million in revenue reported for the third quarter the year before.*

*The Pittsburgh-based company's earnings for the third quarter were $10.1 million, down from $12.8 million in the third quarter of fiscal 1997.*

■ **Xylan Corp.** *has posted fourth-quarter revenue of $64.2 million, up more than 50% from the $41.5 million reported by the Calabasas, Calif.,* **switch vendor** *for its fourth quarter in 1996.*

*Xylan earned $6.6 million for the fourth quarter of 1997, up from $5 million in the fourth quarter the year before. Year-end revenue and earnings for 1997 easily beat out those for 1996. The company also announced a plan to buy back two million of its outstanding shares.*

■ **Hewlett-Packard Co.** *has announced a* **midrange server** *sporting the latest edition of Intel Corp.'s Pentium II chip, a 333-MHz processor nicknamed Deschutes. One of the first machines to be powered by the new chip, HP NetServer LH II, will be available this month for $4,999. Existing LH Pro and LH II systems are upgradable to the new chip.*

*©HP: (415) 857-1501*

## XLNT plugs ATM module into gigabit switch

**By Robin Schreier Hohman**
*San Diego*

XLNT, Inc. is planning to build a module for its Gigabit Ethernet switch chassis by year-end that will let customers add ATM links to their existing FDDI and Gigabit Ethernet networks.

The two-port 155M bit/sec ATM module also will support the ATM Forum's LAN Emulation specification, which allows applications to run among ATM networks and various LANs.

The module will plug into XLNT's Millennium 4000 chassis, of which the company has sold $500,000 worth since its roll-out last fall. The five-slot switch was the company's inaugural commercial product, funded largely through an infusion of venture capital collected by XLNT in 1996.

XLNT began nine years ago as an engineering firm, designing the Catalyst 1200 for Crescendo Communications, which later was bought by Cisco Systems, Inc. XLNT also made FDDI cards for Bay Networks, Inc. and Newbridge Networks, Inc.

The company's current strategy is to help the huge installed base of FDDI customers migrate to Gigabit Ethernet, ATM and other network technologies without tossing away their FDDI investments. Some 6,000 U.S. businesses have FDDI backbones installed, according to Bob Peyser, XLNT's director of product management.

The Millennium 4000's strength lies in its ability to make Gigabit Ethernet look like FDDI in terms of fault tolerance and failover characteristics, Peyser said.

XLNT is trying to offer the same characteristics for ATM through its new module.

One analyst said XLNT's approach to integrated ATM, FDDI and Gigabit Ethernet networks is reasonable, but he said it remains to be seen whether the company has enough clout to compete against much larger rivals.

"Do they have the correct channels, the correct marketing, [and] all the other issues to move products?" asked Craig Johnson, an analyst at Dataquest, Inc., a San Jose, Calif., market research firm.

The ATM module will cost $9,995. The company charges $5,995 for the 4000 chassis.

©XLNT: (619) 487-9320

### ATM addition

**Here's the skinny on XLNT's new Millennium 4000 switch module:**

- **Two ATM ports**
- **Shipping in late 1998**
- **Priced at $9,995**

## Users upbeat about Compaq/Digital merger

*Customers hoping Digital's service and support group will stay intact under Compaq.*

**By Marc Songini**
**and Christine Burns**

Compaq Computer Corp.'s $9.6 billion buyout of Digital Equipment Corp. still awaits assorted shareholder and government approvals before it is completed. But if it were up to customers, the deal would go through right away.

Customers said the demoralized and downsized Digital will profit from Compaq's marketing savvy and vigor, while Compaq could use the boost Digital will give it in service and support and high-end server technology.

"Digital's merging with Compaq will give Digital more direction and focus," said Lawrence Brennan, information systems operations manager at Herndon, Va.-based Servus Financial Corp., which has a 250-node network based on Digital AlphaServers. The acquisition should restore confidence among Digital customers who have been put off by the company's lawsuits, layoffs and sale of business units, he said.

The deal also bodes well for the survival of Digital's high-speed Alpha processor technology, given that Compaq needs to offer high-end machines to match products from rivals, Brennan said. And Compaq is getting a first-rate service organization, he added. "I've never seen anyone more knowledgeable," Brennan said of Digital's help desk personnel. "They're not just like seasonal staff."

"I suspect it will be a smooth transition for Compaq," said James Hutchinson, network administrator at Boston's Children's Hospital, which runs a network based on Compaq servers and Digital network gear and OpenVMS software. "All that will be involved is some cross-training for the Digital folks on Compaq equipment."

But one customer voiced concern that Compaq might not fully appreciate what it is getting in Digital's service and support group. "I won't be happy if they just try to make us think they are maintaining the Digital commitment to support by just putting more field reps out there," said Hal Kuff, systems and network manager at Tesco Technologies, Inc., of Hunt Valley, Md. Digital services Tesco's network of VAX and AlphaServer machines.

Compaq customer Brad Milhorn said the acquisition could wind up benefiting Windows NT customers. While Compaq and Digital already work closely with Microsoft Corp., the integration of Compaq's and Digital's technologies could make for an even more powerful Windows hardware platform. Compaq should be able to take advantage of Digital's Alpha processors and other technology, he said. ■

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### What will become of Alpha?

The fate of Digital Equipment Corp.'s high-end Alpha processor hangs in the balance as a result of Compaq Computer Corp.'s plan to acquire Digital, according to analysts.

Compaq could throw its weight behind Alpha and use the 64-bit chip to build high-end workstations and enterprise servers. This would drive development of compatible software and breathe life into the beleaguered chip.

Alternatively, Compaq could phase out Alpha production altogether and instead build high-end machines using Intel Corp.'s forthcoming 64-bit chip design, code-named Merced, analysts said. Or, the PC vendor could work with a combination of both processors.

"Compaq probably isn't sure itself what they're going to do [with Alpha] yet, but there certainly isn't a termination order in place. Around the turn of the century, everyone and his brother is going to use Merced, and it might be nice to have an architecture that will differentiate you from the pack," said Terry Shannon, editor of "Shannon Knows DEC," a newsletter in Ashland, Mass.

*—James Niccolai, IDG News Service*

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WIRED WINDOWS

# Planning for the new millennium

Have you thought about what your network will look like when the new millennium dawns in two years and 11 months (that's Jan. 1, 2001, no matter what anyone tells you)?

What will your desktop operating systems, network operating systems and applications be?

Microsoft already has announced that Windows 98 will be the last release in the Win9X family and that NT Workstation will be the upgrade path of choice. If you want to control your migration path, you should start planning now.

Three years ago, while we waited for Windows 95 to ship, a typical PC purchase was a 486-based machine with 1M byte of RAM. A better system had 4M bytes, while 8M bytes of RAM was considered only for power users.

Today, 8M bytes of RAM is barely sufficient for single-task users, and 16M-byte machines are becoming standard among Windows 95 users. Companies are finding that NT Workstation really needs 32M bytes of RAM to be productive.

Now, the skeptics among you are saying that even if you had the foresight three years ago to realize that 8M bytes of RAM would be insufficient today, you still wouldn't have been able to justify rolling out machines with 32M bytes of RAM. And that's true, if you consider a three-year plan to be a document you write once and then lock away for posterity.

Your new three-year plan needs to be revised every three to six months. Doing these constant revisions will force you to consider technological changes as they're proposed and allow you to plan a smooth transition to new technologies.

**Dave Kearns**

More important, by revising your plan, you won't be forced to spend massive amounts of money at one time to bring everything up to the new standard.

But don't drop everything and write a 50-page white paper outlining everything that will happen over the next three years. Start by refining your hardware and software inventory list to only include essential information about the versions of products you're using and the current shipping versions of the same products.

Add a simple time line based on vendors' plans for product upgrades and developments. Later, add information about competing products that may be worthy of consideration. Take a look at your company's three- or five-year business plan, and identify areas where IT can be used to further this plan.

For starters, use your IT plan to chart a desktop operating system strategy. Later this year, I'll bring up network operating system and application issues that need to be part of the plan.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.*

## Tip of the week

*While you might think you've heard far too much about the year 2000 problem, a new book from Prentice-Hall might change your opinion. "Time Bomb 2000," by Edward and Jennifer Yourdon, goes beyond the reasons for the problem and explores the possible consequences. Visit www.phptr.com/ptrbooks/ptr_0130952842.html for all the details.*

Before you dive headfirst into digital copiers, we'd like to re-introduce the art of thinking ahead.

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## Briefs

■ **US WEST, Inc.** *once again is trying to unload its cellular phone business to* **AirTouch Communications, Inc.** *The companies tried last year but ran into regulatory problems. They are working on a* **$5.7 billion deal** *that would make AirTouch the second-largest cellular carrier in the U.S. The two companies' cellular businesses already operate as a joint venture.*

■ *Communications vendor* **e-Net, Inc.,** *of Germantown, Md., recently announced its Telecom 2000* **Basic Rate Interface Gateway.** *The device will let users support voice traffic over their intranet or through the public Internet. The gateway connects directly to the user's PBX voice switch and can support up to four ISDN BRI lines. Previous e-Net devices support ISDN PRI and T-1 connections. Telecom 2000 BRI Gateway is available for $6,995.*

*The company also announced a deal with Tygart Technology, Inc. to develop touch-screen interfaces for e-Net's data telephony products. The interfaces will be available next quarter.*

*✆ e-Net: (888) 366-3638*

■ **Concert Communications Services, Inc.,** *the British Telecommunications plc-MCI Communications Corp. joint venture, is developing its* **Virtual Private Data Network (VPDN) service** *that will let multinational corporate users sign up for an IP service that offers classes of service. Based on Cisco Systems, Inc.'s Tag Switching technology, Concert initially will offer its users two flavors of VPDN, premium and standard. But it plans to develop additional classes of service that will offer users more granularity when setting priorities on their traffic. The service will not be available until April.*

*✆ Concert: (703) 707-4000*

# MCI service ties Web users to call center agents

*New Vault-based offering comes with multiple hardware, software requirements for the caller.*

**By David Rohde**
*Washington, D.C.*

MCI Communications Corp. has launched its long-awaited service that enables Web surfers to click a button to speak to a call center agent.

But analysts said numerous limitations in the new network-MCI Click'nConnect service will limit its popularity in the first release. For example, unlike competitors' Web call center integration offerings, Click'nConnect requires a multimedia PC with a microphone and Internet telephony software on the caller's end. And the service does not coordinate Web page views between the caller and call center agent.

MCI launched Click'nConnect at the recent ComNet '98 show here. It is based on MCI's Vault platform, which the company unveiled a year ago. Vault provides a path between the public switched telephone network and the Internet using gateways from NetSpeak Corp.

A key idea behind Vault is to support Web surfing and voice applications concurrently over a single telephone line. In that sense, MCI's approach to Web call center integration differs from AT&T's interactiveAnswers service and Sprint Corp.'s Give Me a Call service, both of which require two access lines (*NW,* Dec. 15, 1997, page 1).

Users of Click'nConnect place a button on their Web site that, when clicked, launches an IP telephony call via the NetSpeak gateway that terminates at a call center agent's telephone.

MCI officials said in the first release, the agent is not able to see where in the corporate Web site the caller is located and does not necessarily know that it is a Click'nConnect call.

"It's strictly voice over the Internet," said Chris Bogdanski, MCI's director of call center marketing. "In future releases, we'll offer push and pull capabilities."

Still, for some Web sites the feature may offer a convenient way to get indecisive buyers to make a decision on a purchase. It also could attract those more willing to state their credit card numbers than type them into cyberspace.

**Consumer market**

Analysts said the initial market would be limited to consumer-to-business applications because corporations generally do not make all the required hardware and software available to users. And even for home users, "I don't know any of my friends who are using their PC as a voice communications device at the moment," said Peter Bernstein, president of Infonautics Consulting, Inc., a Ramsey, N.J., telecommunications and IT research firm.

MCI did not release prices for Click'nConnect, but carrier officials said users would pay four fees: an installation charge, a monthly fixed charge, a per-call transaction fee and the regular 800/888 rate negotiated between MCI and the user. Click'nConnect currently works with 800 and 888 numbers but not with 900 numbers, ruling out certain fee-paid technical support hotlines. ■

Get more online: 5722
- An overview of call center/Web integration
- A look at Lucent's Internet Call Center

www.nwfusion.com

# Gavel in hand, next wireless auction is set

**By Denise Pappalardo**
*Washington, D.C.*

Service providers next week will get the chance to put their hands on high-capacity wireless channels when the Federal Communications Commission auctions off another chunk of the wireless spectrum.

**WHAT YOU NEED TO KNOW ABOUT WIRELESS LMDS**

- ▶ LMDS is in the 28-GHz spectrum.
- ▶ An LMDS license holder will have control over 1.3 GHz of spectrum.
- ▶ 1.3 GHz can support speeds up to 1G bit/sec.
- ▶ LMDS is a microwave broadband service.
- ▶ LMDS service providers will be able to offer voice, video and data services.
- ▶ Service providers are expected to use the technology to quickly offer Internet access, local voice and data services.
- ▶ FCC auctions begin this month.

Specifically, the FCC is auctioning Local Multipoint Distribution Service (LMDS) spectrum licenses, the local loop wireless spectrum that will let service providers offer a variety of voice, video and data offerings.

Late last month the FCC released the names of the 149 companies that have been approved to bid on the LMDS licenses. Cincinnati Bell Telephone, Comcast LMDS Communications, Inc., Southwestern Bell Video Services, Inc. and US WEST, Inc. are among the companies that plan to bid.

Why should business users care about LMDS services? Because the five-year cost of an LMDS-provisioned DS-3, 45M bit/sec service will cost about the same as the per-month charge for a landline-provisioned DS-3 service, said Dan Taylor, senior analyst at the Aberdeen Group, a Boston-based consulting firm.

LMDS license holders will have the option of offering voice, video and data services that could support transmissions speeds up to 1G bit/sec.

LMDS' flexibility is a blessing and a curse for the wireless industry. Because the technology can be used to support multimedia video services, toll quality voice and high speed data transmissions services, LMDS' actual use has been hard to pinpoint, said Ira Brodsky, president of Datacomm Research, a St. Louis-based consulting firm.

Although initially targeted at high-end cable TV packages, there has been a shift to focus LMDS instead on business services, Brodsky said. There is an opportunity to offer business users competitively priced Internet access and data services over LMDS networks, he said.

Services based on LMDS and other high-frequency spectra, such as 38GHz, are very reliable, Taylor continued. Because LMDS requires direct line of site, the main drawback is that when there is heavy rain, the signal can be interrupted, he said.

Despite that drawback, a variety of service providers are expected to jump on the LMDS bandwagon.

For example, LMDS will be used to support wireless-local-loop networks from incumbent local exchange carriers (ILEC), competitive local exchange carriers (CLEC) and even facilities-based Internet service providers.

ILECs are permitted to bid on LMDS licenses outside their region. But the FCC has restricted ILECs from bidding on LMDS licenses within their serving areas. The FCC has not restricted CLECs or ISPs.

LMDS will allow a service provider to more quickly get service turned on or expand into a new area, Brodsky said. This is primarily true because the service provider will not have to lay its own fiber, establish a reselling arrangement or deal with local loop access issues. ■

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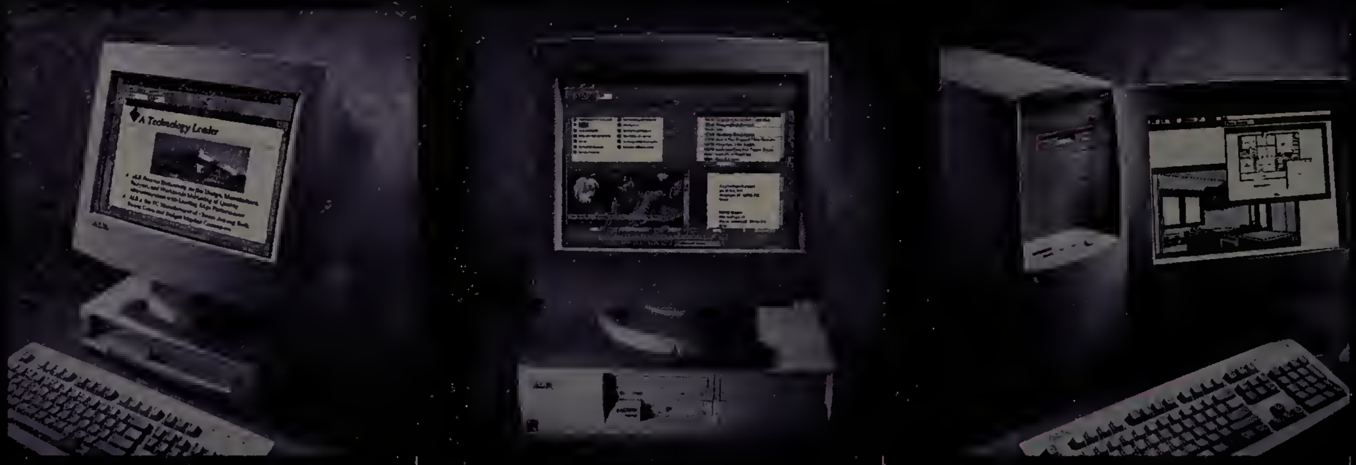

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**EYE ON THE CARRIERS**

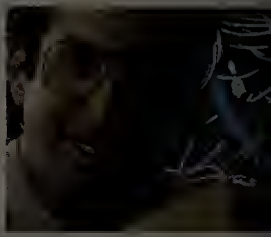
# Are user groups out of touch?

Over the years, coalitions of user groups have emerged in Washington, D.C., under names such as the Unity Coalition and Customers for Access Rate Equity, to make certain demands.

The membership of these coalitions shifts from time to time, but the groups always are anchored by the Consumer Federation of America (CFA) and the International Communications Association (ICA), a group of about 400 companies with large telecom expenditures. And their positions always seem to match those of the long-distance carriers, blaming the RBOCs exclusively for the telecom industry's problems and demanding evermore-exacting conditions before the Bells enter the long-distance business.

Recently, the CFA has come under fire because its research director accepted funding from AT&T and MCI for his own side business (*NW*, Jan. 26, page 1). By association, many wonder why the ICA seems to aim all its fire on key telecom reform issues at the RBOCs, when most of the long-distance carriers also have engaged in heavy doses of excuse-making. ICA doesn't receive carrier support, drawing its budget from its yearly $975 dues. But decisions seem to be in the hands of very few. Its 12-member Telecommunications Public Policy Committee (TPPC) decides issues "on a consensus basis."

Brian Moir, ICA general counsel, says the ICA has never filed one way or the other on an RBOC long-distance application. And ICA members credit Moir with going to bat against long-distance carriers on some issues that hit Centrex users hard, such as pass-alongs of new universal service charges.



**David Rohde**

But TPPC chairperson Ruth Michalecki, who is director of telecommunications at the University of Nebraska, says RBOCs should be unshackled "only when they open up their local monopolies and bring down their inflated access charges." Local competition is almost impossible to find for business users, she insists. "Most of our members have not seen any activity. Okay, maybe NYNEX and Bell Atlantic have a little bit," she says.

I'm sorry, Ruth, but that's out of touch. Local competitors nearly tripled their revenues and installed business lines last year, and some users are inundated with new offers. Of course some of the RBOCs are trying their darndest to block the way. But sheer bandwidth demands are doing more to resolve that than anything else. And surveys, including our own (*NW*, Jan. 19, page 8), show most users no longer see the point of confining the RBOCs within their local access and transport areas.

If the ICA wants to make life hard for the RBOCs, it might consider an approach employed by the Communications Managers Association (CMA), a feisty group of network managers in the Northeast. Before NYNEX merged with Bell Atlantic, I watched CMA members pummel then NYNEX CEO Ivan Seidenberg about NYNEX's chronic provisioning and customer service problems.

Yet when I asked CMA users at a recent roundtable whether they favored Bell Atlantic's bid to enter the long-distance business in New York, the answer was unanimous: Let 'em in. When I asked why, they said: Why not? How does it benefit users to leave their local carrier unable to step one inch outside the LATA?

Maybe it's time for the ICA to poll its members to see if they feel the same.

*Rohde is* Network World *senior editor, Carriers & ISPs. He can be reached at david_rohde@nww.com.*

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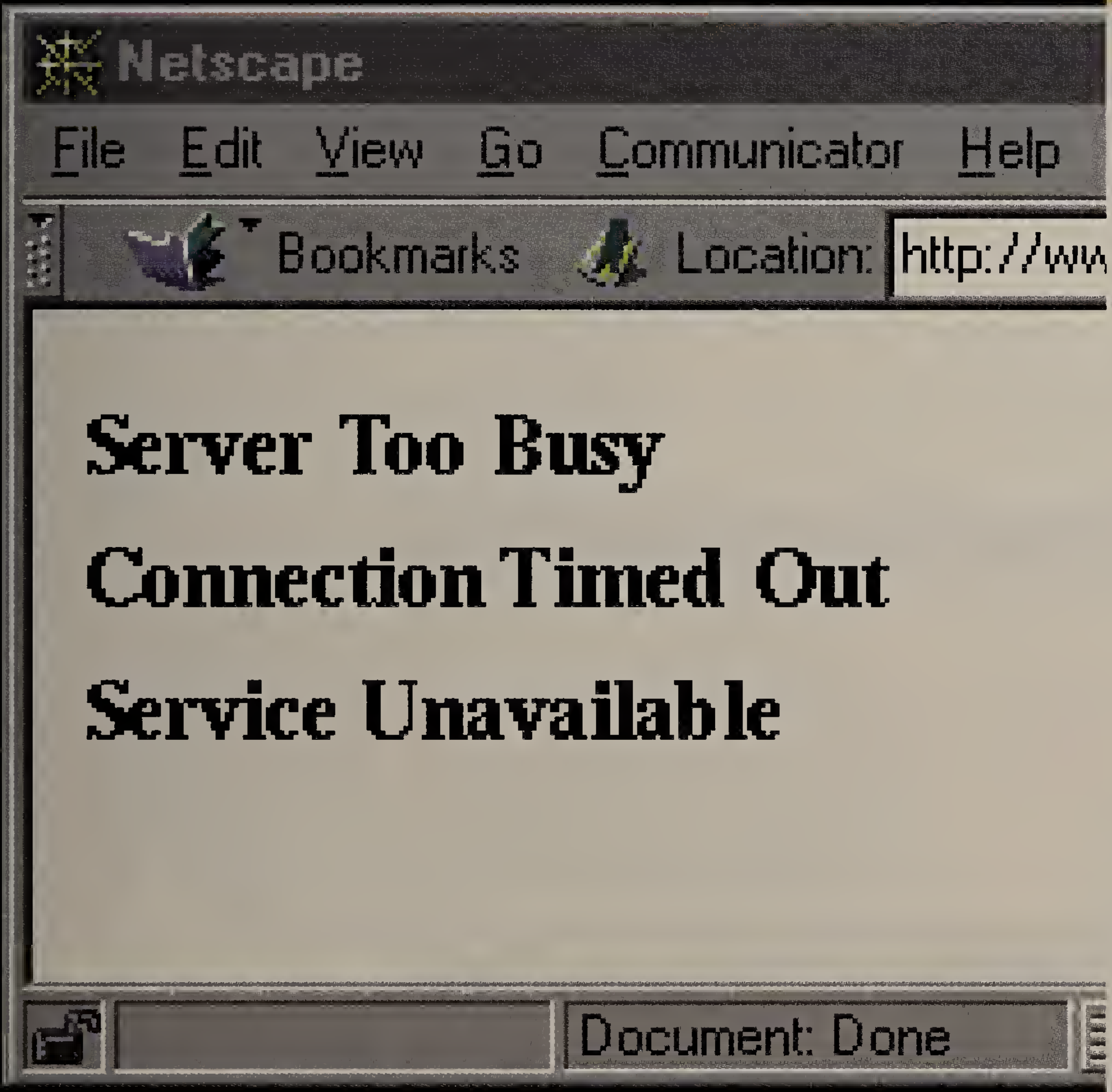
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### *ISP choices*

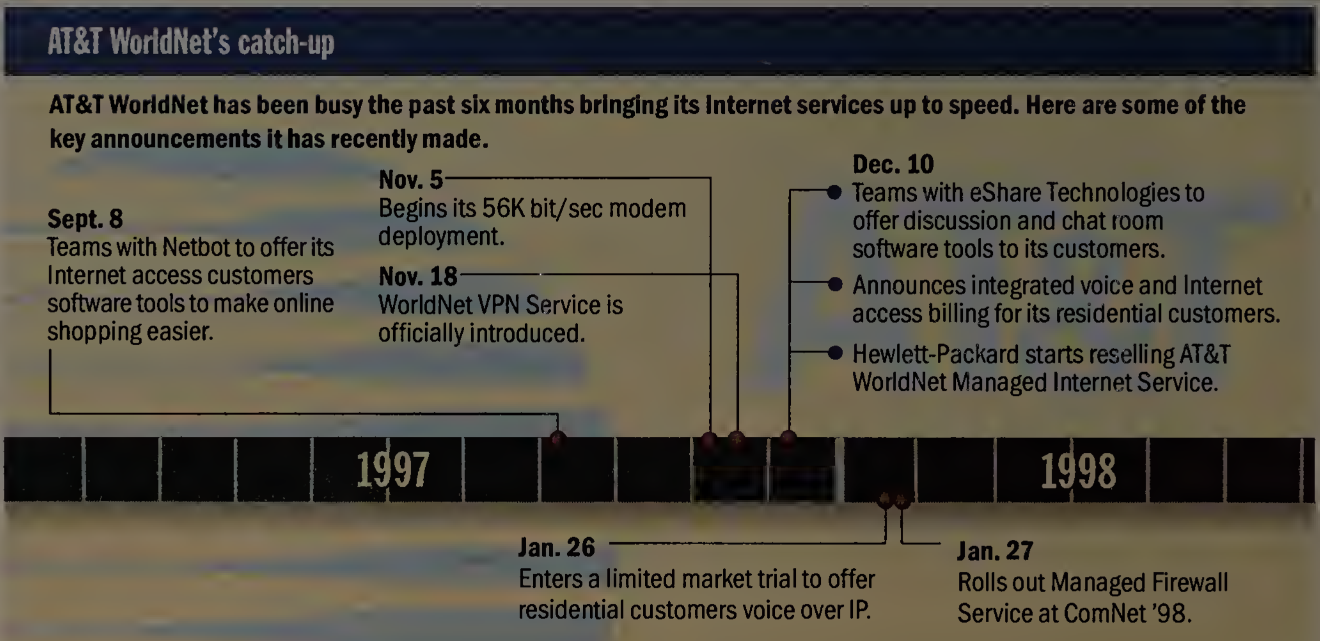
# The building of AT&T WorldNet

*By Denise Pappalardo*

AT&T WorldNet is slowly but surely laying the foundation that should make the company more competitive in the Internet service provider arena.

In the past six months, AT&T WorldNet has been actively filling gaps in its current business services in an attempt to make existing users happy and to keep up with competitors. While AT&T WorldNet has been focused on staying with the pack, the company is also turning its attention to the future in the form of new IP voice services.

The ISP is looking to utilize TCG CERFnet to offer new, innovative services, including an integrated voice and Internet traffic package. CERFnet is part of the Teleport Communications Group (TCG), which AT&T earlier this year announced it would acquire (*NW*, Jan. 12, page 1).



**AT&T WorldNet's catch-up**

**AT&T WorldNet has been busy the past six months bringing its Internet services up to speed. Here are some of the key announcements it has recently made.**

Sept. 8
Teams with Netbot to offer its Internet access customers software tools to make online shopping easier.
Nov. 5
Begins its 56K bit/sec modem deployment.
Nov. 18
WorldNet VPN Service is officially introduced.
Dec. 10
Teams with eShare Technologies to offer discussion and chat room software tools to its customers.
Announces integrated voice and Internet access billing for its residential customers.
Hewlett-Packard starts reselling AT&T WorldNet Managed Internet Service.
1997
1998
Jan. 26
Enters a limited market trial to offer residential customers voice over IP.
Jan. 27
Rolls out Managed Firewall Service at ComNet '98.

AT&T WorldNet is getting focused, says Rebecca Wetzel, director of Internet services at TeleChoice, Inc., a Verona, N.J.-based consulting firm. While AT&T WorldNet may not have been the first with many of its past offerings, it now is "coming out with well thought through services and [it] seems to be delivering on [its] promises," Wetzel says.

Although the future looks bright for AT&T WorldNet, the ISP still needs to patch some holes in its product line before it can move forward. As a step in this direction, at the recent ComNet '98 show the company announced a Managed Firewall Service that uses Check Point Software Technologies, Ltd. Check Point FireWall-1 servers.

**Managed Firewalls**

The Managed Firewall Service is available only to WorldNet Managed Internet Service customers for $2,500 per month, per site. AT&T plans to make the Managed Firewall Service available to its WorldNet Virtual Private Network (VPN) service customers later this year.

Managed firewall services are essential to AT&T's product portfolio, but the ISP is one of the last service providers to market, behind GTE Internetworking, Sprint Corp. and MCI Communications Corp.

AT&T WorldNet also lagged behind in the VPN race. AT&T WorldNet first announced its VPN service toward the end of 1997 (*NW*, Nov. 3, 1997, page 1), well behind ANS Communications, PSINet, Inc. and Concentric Networks, Inc., which were first to market with VPN offerings.

But analysts believe AT&T's late arrival will not hinder the success of the service or the company, and for the first time in recent history, there is evidence that AT&T may no longer be resting on its laurels.

For example, late last month the ISP introduced AT&T WorldNet Voice. This limited market trial with AT&T WorldNet consumer customers is small in scope, but big in concept.

"AT&T WorldNet, of all the ISPs, should be doing voice trials, especially since AT&T is a voice service provider," Wetzel says. The ISP division is smart not to hold back to see what the other ISPs will do in the voice arena, she says. AT&T WorldNet is taking a leadership position in the IP voice market, Wetzel adds.

AT&T needs to show the marketplace that it's not afraid to go after IP voice, especially since other new carriers such as Qwest Communications Corp. and Level 3 Communications, Inc. have already started investing in IP voice networks, Wetzel says.

While voice over IP is seen as a "free" service in some circles, many others see it as a way for carriers to get around local access charges, says Dan Taylor, senior analyst at Aberdeen Group, Inc., a Boston-based consulting firm.

Long-distance carriers pay as much as 45% of their revenue in local access charges, Taylor explains. "IP voice gives them a way of offering local services and avoiding access charges," he says.

According to Taylor, of all the service providers, AT&T should be the company to offer customers telephone rates of less than 10 cents per minute. "In 1996, long-distance service revenues for AT&T totaled $39 billion, MCI $16 billion and Sprint $8 billion," he says. Of the three, AT&T should find economies of scale within its organization to offer lower rates, he says.

**The CERFnet plan**

Now that AT&T WorldNet has its Internet service foundation in place, analysts believe it has the strength to build a solid, resourceful business. This is especially true because the company will be getting additional Internet know-how from TCG CERFnet once the merger with TCG becomes final.

TCG has used CERFnet to develop new services, in addition to integrating its Internet access services with its existing voice and data offerings. Now AT&T WorldNet will have the opportunity to leverage TCG to build new services such as data and voice integration and robust intranet offerings.

The question of how innovative AT&T WorldNet will be has a lot to do with how it will integrate TCG CERFnet into its existing business, Taylor says.

While AT&T WorldNet was catching up with the other large national ISPs, TCG CERFnet was rolling out innovative services that let business customers use a single T-1 for voice and Internet access services, he says.

AT&T is just starting to show its acceptance of such new and different services, even though those services might cut into the company's voice or private line revenues, Taylor says.

While AT&T recognizes that there is a possibility it could lose money in one area of business, it believes strong revenues will come from its business IP services.

In fact, International Data Corp., of Framingham, Mass., is predicting that large-business customers will generate $218 million in revenue for all ISPs based solely on standard dedicated Internet access services by the end of this year. That number is expected to rise to $759 million by the year 2000.

AT&T WorldNet is not willing to let those potential revenues go to competitors, and certainly not without a fight. ■

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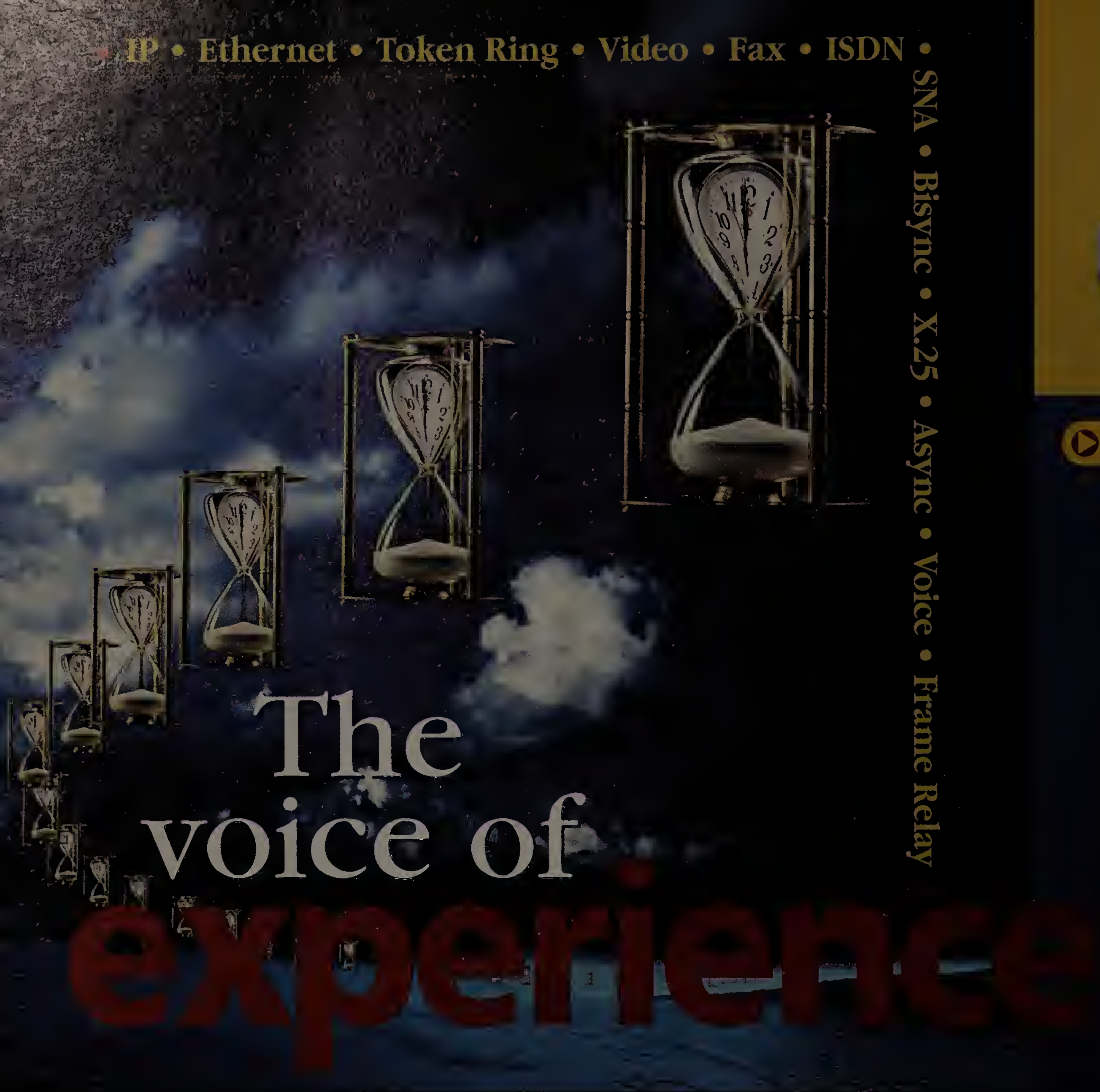
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# Internetworks

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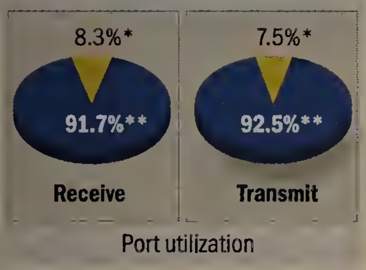
## Briefs

■ **Adtran, Inc.** *has introduced Express, a family of* **digital subscriber line (DSL) modems** *designed for use in campus networks. With Express, customers can link sites in separate buildings or different floors of the same building over regular telephone lines at speeds up to 1.5M bit/sec. Express products support ISDN-based DSL, as well as high-bit-rate DSL, which operates over four wires, and symmetric DSL, a variant of HDSL that operates over two wires. Scheduled to ship in the second quarter, the products range in price from $745 to $1,495.*

*© Adtran: (205) 963-8000*

■ **Sync Research** *recently introduced Envisage, software that lets customers get* **real-time performance information** *from their frame relay networks.*

**SYNC'S ENVISAGE SOFTWARE**



**In this case,** Envisage displays the percentage* of traffic transmitting above the user's committed information rate as well as the percentage** falling within the CIR.

*The data can be used to determine whether carriers are delivering the service level they promised. Available in March, Envisage costs $2,495 to $9,990 depending on the size of the network.*

*© Sync: (800) 275-7962*

■ **Bay Networks, Inc.** *recently said it will enter the* **digital subscriber line (DSL)** *market via a resale agreement with Paradyne Corp. Bay will resell Paradyne's HotWire rate adaptive DSL, high-bit-rate DSL and symmetric DSL products for the customer premises and central office. The Paradyne agreement is the first phase in a blossoming DSL strategy that Bay plans to build on in the coming months.*

## Bay set to unleash frame, cell switching barrage

**By Jim Duffy**
*Washington, D.C.*

Although Bay Networks, Inc. just began shipping its Gigabit Ethernet switches, the company remains bullish on ATM.

Bay is close to unveiling a "tactical solution" for ATM backbone switching that may be built by a third party, said Joe Kennedy, vice president and general manager of Bay's switching products division. This approach will enable Bay to bring a higher capacity ATM backbone switch to market quicker than by internal development.

"We don't have to own [the switch] but we have to control it," Kennedy said.

Bay said it needs a "pure" ATM switch to replace the System 5000BH in network centers for high-density OC-48s (*NW,* Dec. 1, 1997, page 13). Kennedy would not disclose the source of the new switch but rumors are circulating that NEC USA, Inc. or FORE Systems, Inc. are candidates. Kennedy would not comment on those rumors.

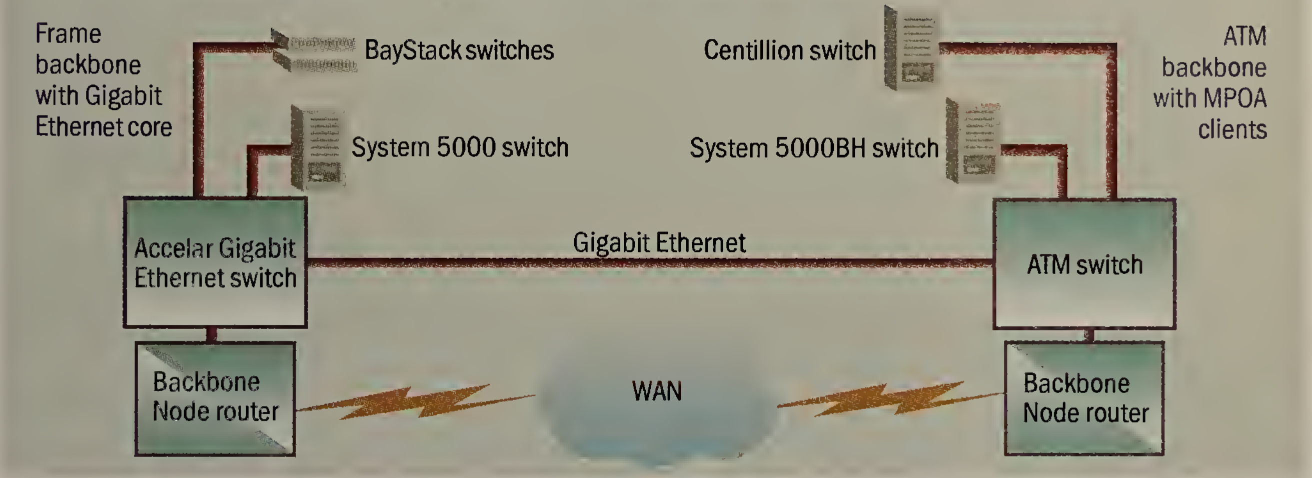
This year Bay also has a number of LAN switching enhancements on tap to bolster its frame and cell strategies for the wiring closet and network center.

For frame-based Layer 2 switching in the wiring closet, Bay this summer will unveil next-generation BayStack 10M bit/sec Ethernet and 10M/100M bit/sec autosensing Ethernet switches that may be stackable and may support Gigabit Ethernet uplinks, Kennedy said.

Bay also is considering Layer 3 switching capabilities for the new BayStack line in the price range of $225 to $250 per port, Kennedy said. Layer 3 switching this close to the desktop would help ensure delivery of quality-of-service policies to the user, he said.

**Any switch way you can**

**Bay's latest frame/cell switching strategy states that frames and cells are equally capable of delivering quality of service to the desktop if Layer 3 switching/routing extends to edge devices.**



For cell-based wiring closet switches, Bay will unveil next-generation Centillion ATM switches by year-end. In addition to OC-12, Private Network-to-Network Interface and Multi-Protocol over ATM, the switches will sport higher LAN and ATM port densities, Kennedy said.

Frame-based network backbones will see a next-generation Accelar Gigabit Ethernet switch from Bay by year-end, Kennedy predicted. Like existing Accelar switches, this new switch will be based on a shared memory architecture, but it will be faster. The box will feature more sophisticated queuing and will forward about 70 million packet/sec.

Bay also plans to add the Resource Reservation Protocol, high-density fiber links, IP Multicasting, IPX routing and high-speed serial WAN links to the Accelar line by year-end, Kennedy said.

In addition to the tactical ATM core switch, Bay's other cell-based backbone switches — the Centillion line and the System 5000BH — will get OC-48 and Gigabit Ethernet links, voice support via circuit emulation, and IP Multicasting support.

With these enhancements on tap, Kennedy all but confirmed the death of Bay's Accelar 100 Layer 3 switch, which is better known as Switch Node (*NW,* Sept. 26, 1997, page 1).

"We're not doing any more development on it, but it's still on our price list," he said.

© Bay: (408) 988-2400

## Hitachi integrates LAN/mainframe links

*Company teams with Bus-Tech to preconfigure big iron with token ring, Ethernet ties.*

**By Marc Songini**

Hitachi, Ltd. is trying to make mainframe connectivity a no-brainer.

The world's second leading supplier of big iron recently announced an agreement to resell Bus-Tech, Inc.'s NetShuttle connectivity products with its line of Pilot and Skyline mainframes.

The agreement means users can buy Hitachi mainframes that are preconfigured to support a variety of downstream LANs or SNA, TCP/IP and IPX networks. The combination is an alternative to employing and configuring more expensive mainframe channel-attached routers from Cisco Systems, Inc., Bay Networks, Inc. and IBM.

Bus-Tech's NetShuttle family of mainframe connectivity boxes lets users link Ethernet, token-ring, and FDDI LANs running SNA, TCP/IP or IPX traffic directly to the mainframe over copper-based bus and tag or fiber-based Enterprise Systems Connection mainframe channels.

"[With this agreement] customers can more easily get the preconfigured mainframe connectivity option they need," said Joe Makoid, vice president of sales and marketing at Bus-Tech. Users who already own Hitachi mainframes can have NetShuttle devices installed and receive service from Hitachi.

Makoid estimated that there are 20,000 mainframes in the U.S.; of those, perhaps 4,000 to 5,000 are Hitachi's. Already some 30 NetShuttle-equipped mainframes have shipped to Hitachi sites.

The agreement means Bus-Tech will have access to sell to Hitachi's large installed base, said Lucinda Borovik, manager of network architecture research at Framingham, Mass.-based consultancy International Data Corp. The value to users is the new functionality being offered, and also that the vast resources of Hitachi's service personnel are now available, Borovik said.

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**Get more online:**

- A Bus-Tech paper that compares NetShuttle to Cisco's 7500 CIP
- A look at Bay's channel-attached mainframe gateway

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INTERNETWORKING MONITOR

# Token Ring: Already built for gigabit speeds

In the 1980s, when IBM offered up Token Ring as an alternative to Ethernet, it found few converts.

Believing Ethernet to be flawed architecturally, Token Ring's creators deliberately designed their LAN to avoid such problems and deliver higher levels of performance, robustness and flexibility.

What was not clear then is becoming clear now. The architects of Token Ring designed it for the wrong era. Key elements of Token Ring's architecture would not become meaningful, or exploitable, at the original 4M bit/sec or even the subsequent 16M bit/sec LAN speed. Without knowing it, the first architects were designing Gigabit Token Ring.

Building gigabit-speed campus backbones presents a unique set of challenges that, at best, are vaguely perceptible at 10M bit/sec or 100M bit/sec. For example: How can gigabit pipes be used efficiently when, even using Ethernet's largest possible frame size, some 80,000 frame/sec are needed to fill the pipe? How can Ethernet provide quality of service/class of service in a multiswitch backbone? Finally, how can a mesh network be built with Layer 2 switches?

Unfortunately, these problems are not easy to solve, since their roots are architectural. Ironically, these areas that now seem underarchitected are those in which Ethernet and Token Ring differ most dramatically. Token Ring will not encounter these problems. The overengineering of the architecture more than a decade ago now can pay off in dramatic and unanticipated ways.

Kevin Tolly

For example, Token Ring's largest frame size became approximately 18,000 bytes with the introduction of the 16M bit/sec specification in 1988.

At 100M bit/sec and gigabit speeds, frame size is anything but an academic issue. Larger frame sizes are a key factor in achieving full utilization of a high-speed LAN. Increasing frame size dramatically reduces the frame processing levels needed to achieve wire speed. It only takes some 7,000 frame/sec to fill a gigabit pipe using Token Ring's 18K-byte frame size.

While achieving maximum efficiency may not immediately interest early adopters, prioritizing the traffic that flows across the network most certainly will.

Token Ring addressed prioritization in its original specification. IBM envisioned a day when users might move multimedia traffic across Token Ring. Prioritizing traffic was, thus, a natural consideration.

With gigabit links relatively affordable and 100M bit/sec ports downright inexpensive, the prudent network manager builds a mesh among switches to guard against a single point of failure.

Where Ethernet's spanning tree bridging algorithm expressly prohibits multiple active paths in the network, Token Ring's Source Route Bridging supports a mesh, and stations can dynamically utilize any and all alternate paths. A mesh is its natural habitat. Architecturally, Token Ring was clearly ahead of its time.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300 or ktolly@tolly.com or http://www.tolly.com.*

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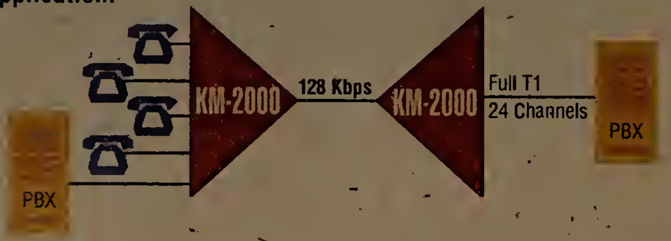

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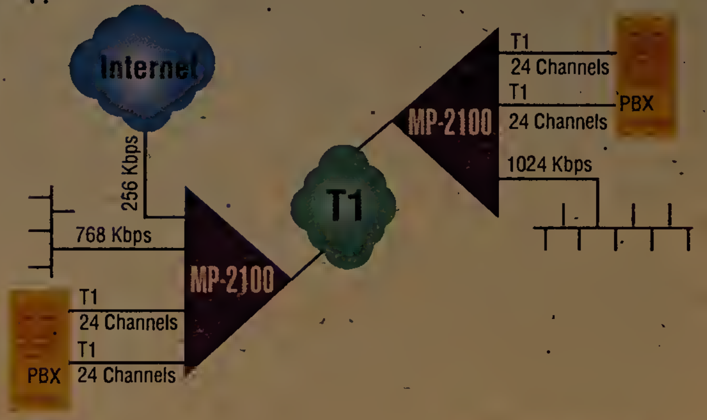

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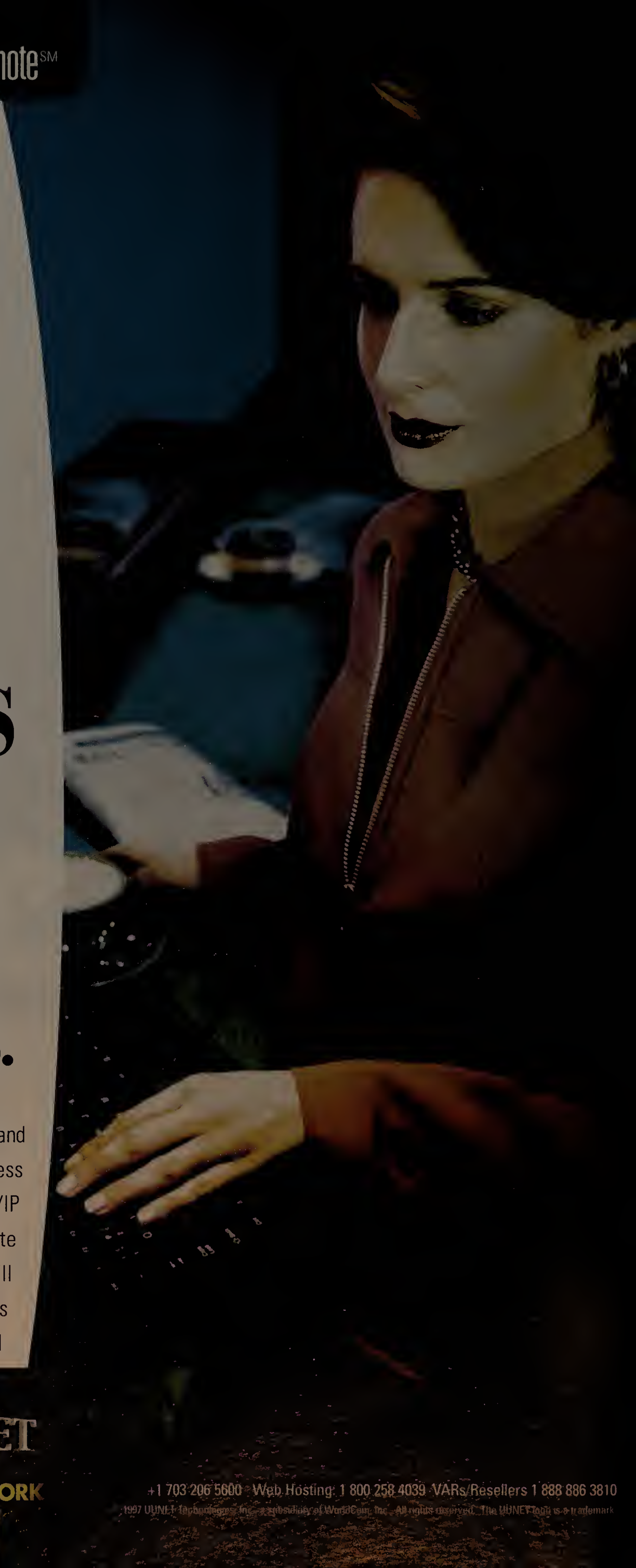

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# Intranet Applications

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## Briefs

■ **Symantec Corp.** *today will announce new versions of two of its Java application development products.* **Visual Cafe for Java 2.5, Professional Development Edition,** *is a tool for writing and deploying Java applets and applications for the Internet and intranets. Features include a customizable user interface and the ability to turn off automatic code generation.* **Visual Cafe for Java 2.5, Database Development Edition,** *allows users to create and deploy applets and applications that interact with relational databases. It includes Sybase, Inc.'s SQL Anywhere relational database and Symantec's dbAnywhere server. The Professional Development Edition upgrade will be available Feb. 23 for Windows 95 and NT and will cost $300. The Database Development Edition will be ready this quarter for Windows 95 and NT and will cost $800.*

*© Symantec: (800) 453-1059*

■ **Search engine company Lycos, Inc.,** *of Framingham, Mass., last week announced plans to buy* **Tripod, Inc.** *for $58 million in stock. Tripod, of Williamstown, Mass., is a popular Web site with twentysomethings, boasting about one million members. Lycos began as a search engine firm and in recent months has added e-mail and chat services.*

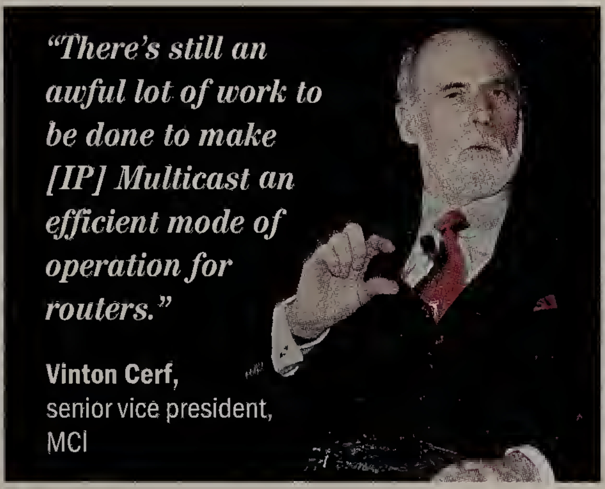
■ **Electronic commerce** *is being used to* **augment existing business strategies** *rather than to create new sources of revenue, according to a new report from* **International Data Corp. (IDC),** *a Framingham, Mass., market research firm. The report, called "Web Sellers Speak," states companies are using the World Wide Web mainly as a way to streamline business.*

*© IDC: (508) 872-8200*

## MCI's Cerf muses on IP Multicast

*Internet pioneer is bullish on bandwidth-saving multimedia transport technology.*

Q&A The second IP Multicast Summit opens today in San Jose, Calif. It is an event designed to promote widespread deployment of the technology that supporters say efficiently transmits multimedia content over the Internet. One of IP Multicast's backers is Vinton Cerf, senior vice president of Internet architecture and engineering at MCI Communications Corp. and a man many refer to as the "Father of the Internet." Cerf, who will deliver the two-day summit's opening keynote speech, recently spoke with *Network World* Senior Writer Chris Nerney about where IP Multicast is at and where it is going.



*"There's still an awful lot of work to be done to make [IP] Multicast an efficient mode of operation for routers."*

**Vinton Cerf,**
senior vice president,
MCI

**At last year's summit, the message to the audience was to persuade Internet service providers to support IP Multicast. How much progress has been made toward that goal?**

There's been a substantial amount of progress. More ISPs are beginning to announce multicast services. [MCI] did, for example, and UUNET did, and I think several others.

Also, the vendors who make software that will allow routers to do multicast have come some distance in improving implementation and efficiency.

But there's still an awful lot of work to be done to make multicast an efficient mode of operation for routers. It still consumes a significant amount of router resources to implement [multicast technology].

**Where do you expect to see IP Multicast initially deployed?**

You'll see IP Multicast facilities used more in enterprises than you will on the public Internet, simply because the resources of the virtual private net or the corporate net can be better controlled and adapted to multicast use.

**Currently, what are the biggest roadblocks to widespread deployment of the technology?**

To get multicast to be reliable for purposes of software distribution is a big challenge, but if it's a matter of HTML page distribution or video or audio or something which is more forgiving, we are much closer to having that sort of thing regularizable, if that's a word. Being absolutely 100% reliable using multicast techniques still begs a lot of technical questions.

**What are the most important IP Multicast developments we can look for this year?**

One of them will be simply increased deployment and demonstration of services. As people begin to see new applications that take advantage of this technology, that will stimulate interest on the business consumer side or the mass market side. And it will also stimulate interest among the ISPs.

**What are the most prevalent uses of IP Multicast today?**

I would expect to see a good deal of use on the enterprise level for distribution of price lists and other information that changes on a regular basis. On the end-user side it could be news information that's being distributed. Whether the modality is video, audio, text or Web pages is almost irrelevant. The same mechanism will deliver the bits regardless of the application.

**What is MCI doing with IP Multicast?**

Last year we looked at implementing IP Multicast in the public Internet and concluded not to do it during '97. We did implement it, however, in our very broadband network service, which is a special service we developed for the National Science Foundation.

**Are there any emerging technologies that pose a threat to IP Multicast? Are there alternatives that also save on bandwidth and deliver multimedia information?**

If you use cable or digital satellite, you can do a very credible multicast. I would expect the basic Internet to be augmented by the use of digital broadcast satellite for multicasting or digital one-way cable. You don't even need two-way cable to make it work. ■

PHOTOS: STAN BAROUH

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- IP Multicast overviews and papers
- An account of Cerf taking on Ethernet inventor Bob Metcalfe at ComNet '98

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## Netscape revs up new apps server, development tools

**By Andy Eddy**
*Mountain View, Calif.*

Netscape Communications Corp. last week started shipping Application Server 2.0, the first fruit of Netscape's acquisition last year of Kiva Software Corp. Netscape also began shipping several complementary development tools.

The new incarnation of what was once called the Kiva Enterprise Server "can handle thousands of simultaneous users with 24x7 access," according to Marty Cagan, Netscape's vice president of platforms and tools. The server features new load balancing and session management technology to support the improved scalability and availability.

Among the ancillary products is Application Builder 2.0, a graphical user interface-based tool suite that enables developers to use existing tools such as Microsoft Corp.'s Visual Basic and Sybase, Inc.'s PowerSite to create applications that will run on Application Server.

Another new product, Extension Builder, lets developers extend terminal-based legacy applications so they can run within Web browsers. Along those lines, Netscape released ready-to-use extensions for its application server that offer access to existing BEA Systems, Inc.'s Tuxedo and IBM's MQSeries programs.

Application Server 2.0 costs $25,000 per CPU on Windows NT machines or $35,000 per CPU on Solaris, HP-UX or IRIX systems. Application Builder 2.0 carries a price tag of $1,295 per developer. Both products are available now. Extension Builder's pricing and availability will be announced by the end of March. The Tuxedo and MQSeries extensions each cost $3,495 per CPU for Windows NT machines and $5,495 per CPU for Unix systems.

© Netscape: (650) 254-1900

'NET INSIDER

# The Internet for the Internet

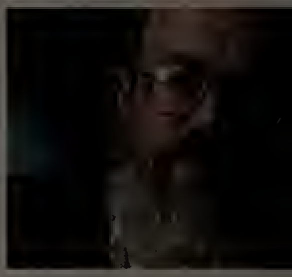
The U.S. government late last month issued the first draft of its proposal for internationalizing and institutionalizing management — some people would say governance — of Internet domain names and addresses. The plan, called "A Proposal to Improve Technical Management of Internet Names and Addresses" (www.ntia.doc.gov/ntiahome/domain name/dnsdrft.htm), is expected to be revised after a comment period.

The draft proposal lacks specifics in a number of areas that will need to be detailed in any final plan. This sketchiness is good, however, since it will force people reviewing the proposal to focus on concepts rather than minutia.

The concepts are important. The proposal would turn much of the management of the Internet's technical aspects over to the Internet community. The basic management entity would be a U.S. not-for-profit corporation, but the corporation's board would be heavily international and biased to include those that have made the Internet a success as well as organizations that depend on the 'Net. There would be no continuing management control over the Internet's technical aspects by the U.S. government or any other national government.

That is not to say that governments will not continue to try to be involved in Internet commerce, security and content policies. This proposal is a big step, but one that is vital if the Internet is to escape the technological lethargy that has hampered traditional telecommunications.

Half the board would be filled with Internet user representatives, including individual end users, not-for-profit organizations and commercial users. The other half would be appointed by groups that represent the IP address registries, domain name registries and registrars, and the Internet standards creation process.


Scott Bradner

The new organization would help define and oversee rules for creating new top-level domains, the root name servers and the allocation of IP addresses.

The proposal talks a lot about domain names, and there are some real problems with the proposal in this area. The proposal seems to support for-profit ownership of top-level domains, the very kind of monopoly that led to the mess we are now in. It also hints, but does not specifically say, that all new domain name registries would be able to register names in all non-country code top-level domains, including .com, .net and .org. This is not a small detail. The willingness of new name registry organizations to accept the proposal will depend significantly on what it really means on this matter.

This proposal will have significant opponents. The traditional telecommunications industry will try to do through rule-setting what it could not do in the real world: play a real role in the 'Net. Some libertarians will question the U.S. government's authority to play a role here. People who saw an opportunity to create a monopoly by overseeing certain domain names now see their pot of gold evaporating. This proposal is a watershed, and the thrust vector is in the right quadrant.

Disclaimer: As part of the IETF and IP Address group, I may be affected by the proposal, but the comments are mine, not those of Harvard (which is suspicious of governments that are two-thirds its age).

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.*

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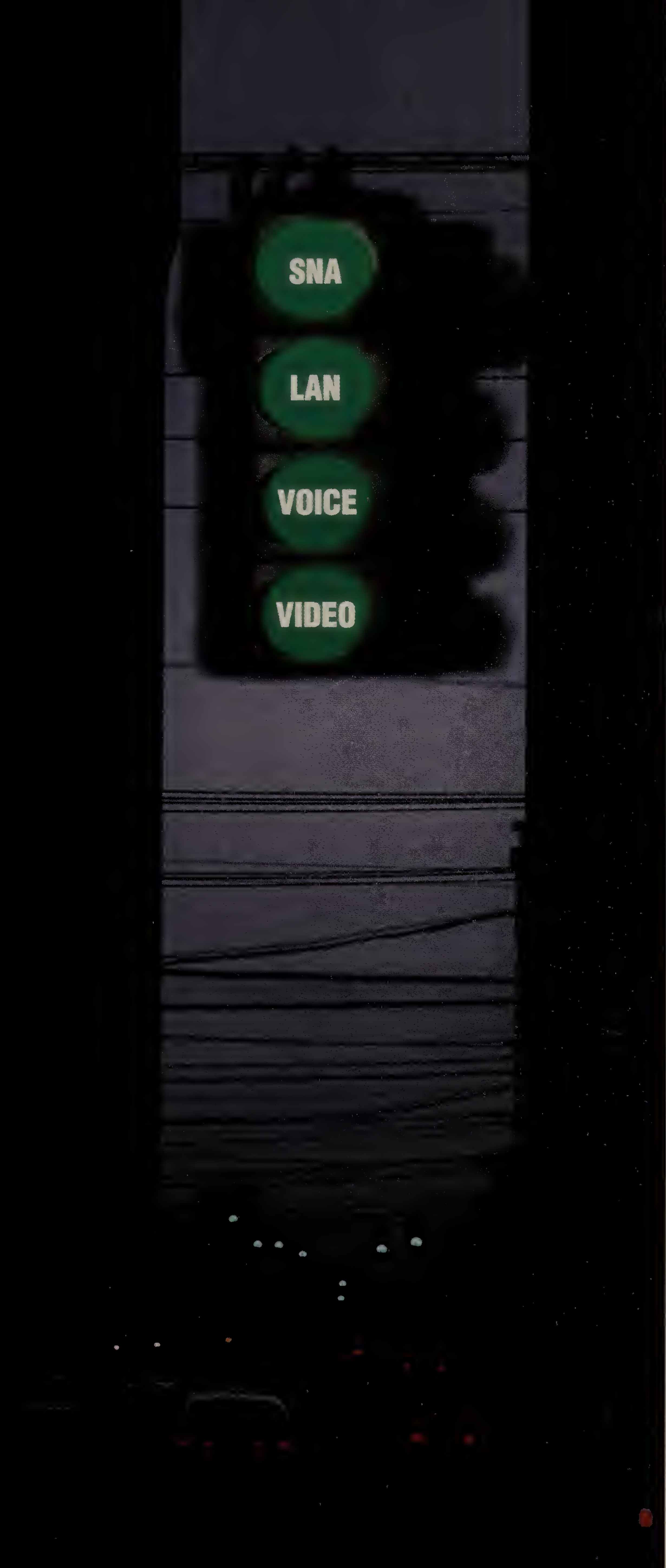
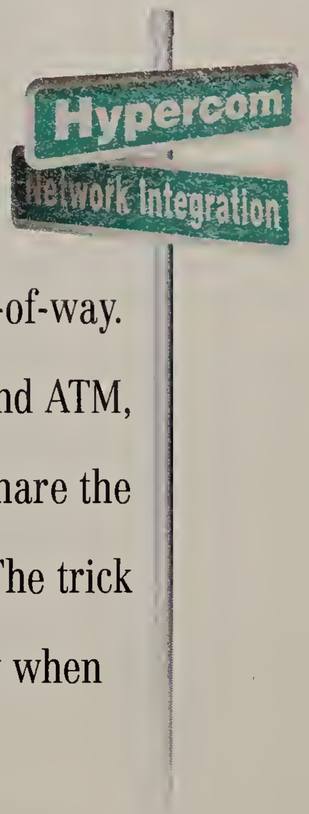


# Give All Of Your Applications The Green Light



Directing traffic on the wide area network used to be simple: SNA always had the right-of-way. But now, thanks to Frame Relay and ATM, voice and video applications can share the WAN with legacy and LAN data. The trick is to give them all the right-of-way when they need it.

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# Technology Update

**Covering:** Evolving Technologies and Standards

## UTTER'S NETWORK HELP DESK

*Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to rnutter@world.std.com.*

**I am getting ready to roll out Windows NT on approximately 200 workstations. To minimize the time required for the rollout, I would like to clone the installations, but I recently discovered that Microsoft Corp. support staffers will not assist callers when they learn they are dealing with a cloned installation. How can I limit the hours spent installing each workstation individually? Why has Microsoft taken this stance on not supporting cloned installations?**

**Via the Internet**

I'll deal with your last question first. From information I have read, Microsoft has taken this stance because two security identifiers in the NT registry are not changed when an installation is cloned. This potentially could cause problems on a network in which resources are being shared among NT workstations, for example.

The folks at Innovative Software, Ltd., which makes the popular Ghost product, have addressed this problem with an add-on called GhostWalker. After installing a cloned NT, you run this to "randomize" the two security identifiers and prevent them from causing a problem.

Several other Ghost features also may be of benefit to you. A recently released multicast option allows for the image to be broadcast simultaneously from one workstation to several others without each workstation having to request the image.

Ghost has the ability to resize the cloned image it is placing on a target drive dynamically to accommodate a drive size that's different from the drive on which the image was prepared. If your workstations are going to have significant customizations for each user, you can prepare a generic image that gets most of the work done for you, and then prepare a unique image after completing the customizations. This helps minimize the work that has to be repeated when a hard drive is upgraded or replaced.

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# Demands for speed and quality of service drive evolution of frame relay services

**By Bob Sullebarger**

As private-to-public network migration gathers momentum and accessing high-volume Web sites becomes a daily business routine, the frame relay market boom is continuing. But LAN users seeking traditional bandwidth-only services are no longer the driving force.

It is clear that what has been good enough for the LAN market will not suffice in today's Internet/intranet, public network age.

Service providers must be able to offer fast, scalable and rock-solid frame relay service for mission-critical applications. This includes service-level agreements (SLA) based on throughput and delay, as well as availability guarantees that go beyond ensuring that traffic will arrive to *guaranteeing* it will arrive. These demands are giving rise to frame relay technology enhancements that carry a number of benefits for service providers and their customers.

### Rapid progress

To keep pace with the new forces driving the market, frame relay technology now is evolving to provide high-speed access and quality of service (QoS). This includes improvements that enable service providers to bolster frame relay speed and scalability while retaining its traditional cost efficiency.

Frame relay also is beginning to provide QoS capabilities to help service providers meet the demands of users considering migrating to public networks as a less-expensive alternative to leased lines. Frame relay QoS gives service providers a means of offering differentiated, application-specific services at different price points. Some of these services include frame relay for LANs, frame relay for SNA and frame relay for voice.

Now that the technology has evolved, the rush is on to deliver value-added frame relay services.

Indeed, some service providers have already announced QoS on frame relay and have begun writing SLAs, although their networks are not quite ready to make this guarantee. Recognizing the competitive advantages to be gained, these service providers have decided to begin selling first and then upgrade their networks to support these agreements later.

The new service classes that enable advanced frame relay services for SNA, voice, Internet, intranet and LAN traffic include:

- Real Time Variable Frame Rate, which provides committed bandwidth, low delay, delay variation and frame loss. It enables users to write SLAs with specified delivery characteristics for delay-sensitive traffic.
- Non-Real Time Variable Frame Rate, which provides committed bandwidth, moderate delay and low frame loss. It enables LAN-to-LAN and business-class Internet/intranet access services.
- Available/Unspecified Frame Rate, which provides a best-effort service using any remaining bandwidth. It enables e-mail, file transfer and residential Internet access services.

Offering these new service classes is a departure from the days when traditional frame relay service was provided with committed information rate capability only and limited scope for differentiation. Service providers now are recognizing that customers want to be able to select a service from a menu of choices that best fits their needs. And users are willing to pay more for a low-latency service than a best-effort service.

In response, service providers are repositioning their offerings for specific duties, such as SNA interconnect service and voice over data, among others, and marketing them in terms of the problems they solve. This broadens the market by simplifying offerings and enabling service providers to create a wide range of packages that better match the way customers want to consume services.

### Net management

The evolution of frame relay technology, of necessity, includes network management. Management packages now must provide subscribers with throughput, delay, availability and utilization information and offer proof that these service classes were delivered. The packages can do this via printed reports or customer network management capability, in which users can directly monitor their portion of the network.

Underscoring the ongoing importance of frame relay, the Frame Relay Forum now is moving to standardize QoS classes with common nomenclature and definitions so customers can compare them effectively. Work on the frame relay QoS standard now is underway and contributions to date include specific performance values for frame loss and frame transfer delay.

Frame relay is gaining broader appeal by addressing the needs of a changing market. It enables service providers to generate new revenues with a wide range of offerings and enables end users to pay only for the priority levels and services they need.

*Sullebarger is a senior manager of product marketing for network equipment vendor Ascend Communications, Inc., Core Systems Division. He can be reached at (800) 621-9578.*

## UP CLOSE

### Ensuring QoS in a frame relay network

The Frame Relay Forum is standardizing quality-of-service classes with common definitions so users can effectively compare services. The forum is attempting to define specific performance values for frame loss and frame transfer delay. The forum and service providers agree that to be effective, frame relay QoS must include three principal elements:

- Fair-Share Queuing:
  Provides each class of service with a fair share of the bandwidth.
- Quality of Service-Aware (QoS-Aware) Circuit Routing:
  Provides an intelligent, automatic algorithm that sets up paths through frame relay networks to deliver required service levels.
- QoS-Aware Congestion Control:
  Provides intelligent packet discard to meet class-of-service guarantees.

*These elements result in service classes with different priority levels. Creating different classes of service allows mixed network traffic (such as SNA, LAN and voice) to flow smoothly over the same frame relay pipeline.*

### Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney by phone at (508) 875-6400 or e-mail at michael_cooney@nww.com.

## EDITORIAL *insights*

# Thin-client vendors: Are you ready to rumble?

*Network World's* Network and Systems Management Showdown is history. But the more than 500 ComNet '98 showgoers who braved the elements to attend the event were treated to a fast-paced sparring match between the platform purveyors.

Executives from Computer Associates, IBM/Tivoli, HP, Sun and Cabletron traded questions and barbs — even e-mail from rivals' unhappy customers — along with information about their future product directions and strategies.

**Which vendors do you want to participate in the Thin-Client Face-off?**

Now it's the thin-client vendors' turn to take the stage. During the upcoming Las Vegas edition of NetWorld+Interop '98, we'll be staging "The Thin-Client Face-off," where we'll put the competing thin-client camps under the microscope in a special session. (It will be held from 10:30 a.m. to noon on Tuesday, May 5, in Rooms 219-222 of the Las Vegas Convention Center.)

The various thin clients — from Java machines to Windows terminals — promise to save you money and simplify administration. But will they? And which vendors have the best designs and ideas? Which approach will have the greatest impact on your enterprise network?

As with past showdowns and face-offs, we'll challenge the key vendors to send their top technical execs to debate strategy and tactics.

To prepare for this session, I'd like some advice from you. Which vendors do you want us to invite and what would you like to ask them?

Hardware and software companies that are leading candidates for participation include: Sun, with its JavaStation network computer (NC); IBM, supplier of the Network Station NC; Network Computing Devices, an early proponent of thin clients; hardware makers Neoware Systems and Boundless Technologies; Oracle's Network Computer, Inc. subsidiary, which makes software for Java thin clients; Microsoft, which is pushing the Windows-based Terminal Server and ally Citrix Systems; and Java-terminal maker Wyse.

There are a couple of wild cards we could introduce into the mix. For example, Intel, with its recently announced "lean-client" strategy, would support many new kinds of computing devices. Should Intel be at the podium?

And what about PC makers like Compaq or Dell that haven't jumped on the thin-client bandwagon?

Drop me a line or go to Network World Fusion (www.nwfusion.com) to share your ideas. And all you thin-client vendors: Get ready!

*John Gallant, editor in chief* jgallant@nww.com

*Intranet applications • Dale Dowdie*

# This year, extranets become practical for everyone

If 1996 was the year of the Internet and 1997 the year of the intranet, 1998 will be the year of the extranet.

While many businesses have embraced Internet technologies such as Web sites and e-mail, some — particularly small-to-midsize firms — have not seen any return on the investment, other than the status of having their own Web site. The growing use of extranets, especially for electronic commerce, is changing that situation. Now it is becoming more and more evident that the Internet can provide viable cost-saving or revenue-generating solutions to businesses of all sizes.

So what exactly is an extranet? Why would any organization, especially a service-based company that is not selling products on a large scale, want to implement one?

An extranet is simply an Internet application that maintains live, relational corporate databases that can be updated via the Internet or the internal corporate network. Rather than regenerating a Web site each time the information is updated internally or externally, an extranet stores and retrieves information from the database and updates the Web data on the fly.

Companies currently use database/Web integration tools on their corporate intranet sites. This year, more and more organizations will make limited amounts of information available to the general public or specific customers via secure Web-based transactions.

The two things that make extranets viable are the server-based Open Database Connectivity and Java Database Connectivity instruction-processing capabilities of the latest Web servers and the Secure Sockets Layer encryption built into the latest browsers. These enable any company to create a Web site with direct links to corporate databases. Server-side processing allows transactions to be processed interactively, without requiring regeneration of HTML on the Web site or client-side processing.

In the past, putting a catalog online was expensive, costing anywhere from $20,000 to $70,000. It also required quite a bit of maintenance because of regular changes in products, styles and prices. Most companies could not afford the cost in software, hardware and additional manpower. This year, we'll see a rash of low-cost products for setting up and maintaining an Internet commerce site, including credit card processing products that sell for as little as $250.

What about service organizations and other small businesses that have not fully embraced the Internet? Extranets offer the possibility to coordinate with customers in a low-maintenance, highly productive manner. Accountants can have clients file tax returns online. Doctors can have patients schedule appointments, order prescriptions and review medications online. Lawyers can schedule meetings, perform and update research, and coordinate with one another online. Restaurants can take orders, update menus and offer specials online. Consulting firms can process requests for troubleshooting as well as help desk and other services remotely. Some supermarkets already are offering home delivery for Internet-based ordering.

All of the information that is processed online can be stored and retrieved live, via a database on the corporate network that is managed internally to keep all information up-to-date. Access to these services can be limited to select customers or open to anyone. Security options are many, depending on the information being processed.

Overall cost for such a system is under $5,000, including the hardware. If you already have the server hardware, the cost could be as little as $250 for the Internet commerce software plus any additional consulting or development services.

Such a small price for such a great return on investment.

For the first time, Internet technologies can prove to be a truly viable solution for any company — for more than just e-mail.

*Dowdie is president of Intellitech Consulting Enterprises, Inc., a Malden, Mass.-based technology consulting and software development firm. He can be reached at ddowdie@intellitech.net.*

## MESSAGE QUEUE

*Send letters to nwnews@nww.com or John Gallant, editor in chief,* Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

### The thin-client debate

*Editor's note: To accompany our featu "PC users won't take NC for an answer" (Jan. 19, page 35), we set up a conferenc area on Network World Fusion and aske readers for their thoughts on thin clients. Below are some of their responses.*

I have never thought of the networ computer (NC) as a PC replacement. However, I have never found the PC t be a reasonable, workable or decent tool for people who only need access t WordPerfect and e-mail.

I work at a hospital. Our system co sists of about 300 dumb terminals attached to four Digital Equipment

Reality Check • Thomas Nolle

# Cheap switches will change the LANscape

With Bay Networks and 3Com locked in a deadly battle to decide which company makes the cheapest LAN switch, users face the happy prospect of getting LAN switching for less than a shared-media network interface card would have cost five years ago. At ComNet last month, 3Com announced a new version of its SuperStack II Gigabit Ethernet switch that sells for half the per-port price of the previous version. Meanwhile, Bay promised its BayStack 250 hub at only $75 per port. How low, as they say, can you go?

But will this cheap switching speed help or hurt the network overall? And does fast edge switching change some of our almost-sacred assumptions about LAN planning?

Let's address the second question first. For almost a decade, vendors have been telling us that the old 80-20 rule, which held that most LAN traffic was confined within the workgroup, was changing. We were supposed to be entering a new age in which LAN users sucked data from every nook and cranny of the business, destroying traditional traffic patterns.

Well gang, apparently the people buying workgroup switches didn't read about that trend because they're actually loading up network capacity and high-bandwidth applications more at the workgroup level than anywhere else. If the 80-20 rule is breaking down, it's possible that it's becoming more like 90-10 in favor of localized traffic.

A shift in LAN capacity reserve toward the workgroup would create a LAN with a sharp technical and political bias toward the edge user. Departments within organizations can buy cheap switches as readily as cheap PCs, thereby defeating the central LAN planning some companies still believe they have in place. That makes it harder to deploy LAN features that are designed to operate at the enterprise level, such as policy management of LAN quality of service (QoS), because all of the switches may not support the desired features.

Standards in areas such as QoS and management are notoriously difficult to develop at the pace the market requires. A shift in switch buying toward the network edge could push back adoption where standards aren't in place.

Increasing LAN capacity at the edge also creates potential problems with those applications that do operate across the enterprise. LAN applications don't have an effective strategy for dealing with congestion — data piles up until it gets discarded somewhere along the path. The loss of data signals applications to throttle back their flow control. That's as efficient as controlling your highway speed by accelerating until you run into the car in front of you, then stopping for a while.

In the past, congestion in shared-media edge LANs helped to keep applications from pumping megabytes of data into congested core LANs and WAN gateways. With edge congestion eliminated, traffic could pile up in second-tier switches or routers, exhausting buffers and creating performance problems.

Making a transition from shared-media LANs to LAN switching is a basic change in LAN architecture, not just a matter of gluing a few switches onto the network here and there. A switched LAN should be hierarchical, with each level providing increased switching capacity and faster LAN trunks.

Today's cheap workgroup LAN switches rarely are useful at the second tier of the switch hierarchy. A 10M bit/sec switched workgroup needs a 100M bit/sec switched second-tier LAN switch, and the third tier needs to provide gigabit-level capacity. Users often complain that low prices in workgroup switches aren't carried up to the higher tiers. Consequently, users are tempted to deploy the same 10M or 100M bit/sec switches at all the levels of the network, ignoring the converging traffic and increased congestion this creates.

But the real problem with architecting a switched LAN that will perform effectively for both workgroup and enterprise applications is procurement politics. It's easy to see who has to buy a workgroup switch — whoever runs the workgroup. Second- and third-tier switches don't have such convenient and direct associations with a management level, and so often the "LAN group" is expected to buy them. But the LAN group doesn't make or sell the company's product and often finds that getting the capital budget to enhance the network's core is a tough proposition.

In a recent survey by CIMI of almost 300 companies conducted by my organization, six out of 10 workgroup network managers said they could purchase local switching for their workers simply by signing for the equipment. Five out of every six central LAN managers in the same survey said they had no capital budget for switching at the second tier and higher. That's as logical as buying electrical appliances without installing outlets.

Line departments at the network's edge are gaining control of the network's purse strings and its evolution — at least for their local part of the network. This is because companies are seeking more direct business justification for technology purchases, and that requirement is easier to meet if you're a department that's really conducting business. As a result, the network staff or infrastructure technology groups are finding it harder to get money. If this trend continues, progress in the core may cease and enterprise application goals — including intranets — may be compromised.

*Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or at tnolle@cimicorp.com.*

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Corp. Alphas running under an operating system called Magic.

The only time the system goes down is for OS updates (once every 12 to 18 months) or software upgrades (once every 18 to 24 months).

Neither NetWare nor Windows NT matches this track record, nor does any PC using any operating system.

*John Trinkaus*
*Director of IS*
*Redlands Community Hospital*
*Redlands, Calif.*

Simple competitive forces will drive eventual full-scale business deployment of the thin client. Current technical difficulties will be overcome.

PCs were not originally designed to be network devices in the first place. A PC is for home. A terminal is for work.

*Ralph Bentley*
*Portland, Ore.*

Having worked in a mainframe shop using a dumb terminal with no independent capabilities, I think thin clients sound better than they actually would be in practice. It is easy to forget many of the reasons that drove us to PCs in the first place. I really don't think that we want to re-create with networks what has existed in the big iron world for a long time.

Unless network speeds reach something approaching light speed, thin clients have too many liabilities to be truly viable in any universal sense.

*Juanita Bingham*
*Computer analyst*
*State of Washington Department of Financial Institutions*
*Olympia, Wash.*

Thin clients will replace dumb terminals, and PCs will stay on the desktop. The personal computing genie is out of the bottle, and users will not let computing power be recentralized. There is a bigger picture, though.

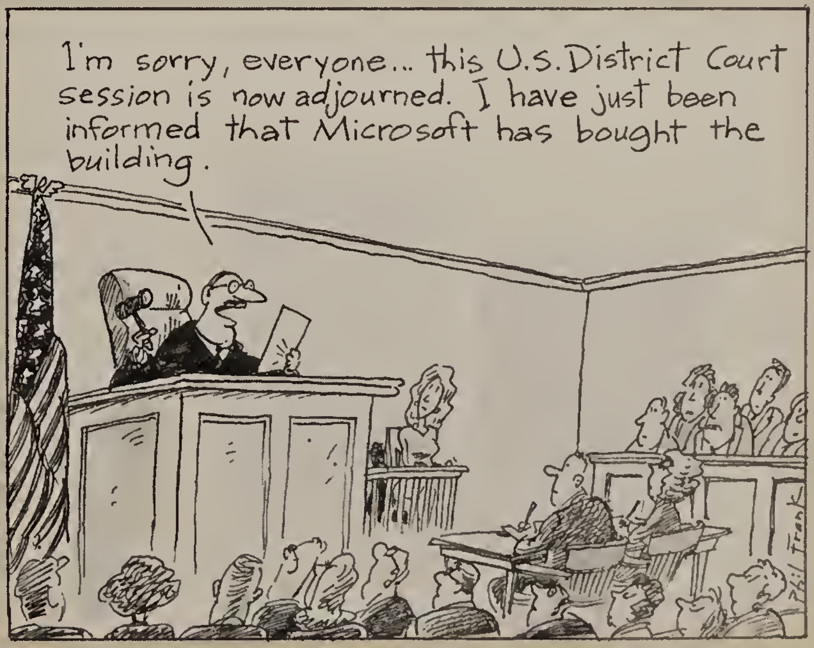
The traditional PC/LAN/WAN architecture is an upside-down pyramid. You have a 100M bit/sec internal bus connected to a 10M bit/sec LAN connected to a 1M bit/sec WAN. It's a bottleneck by design. Without thick clients, the network would collapse.

With the ongoing fiber-optic building boom making 155M bit/sec ATM widely available and the move to LAN technology that is 100M bit/sec or faster, the enterprise network bottlenecks are removed. This will allow thin applications to run on both NCs and PCs in an enterprise environment.

The benefit here is the reduction in support cost. Power users will still demand the ability to do basic computing autonomously, and this can be supported by a PC and standard application suite. But deploying and maintaining multiple specialized applications, especially on distributed PCs, is a nightmare. This is where the thin application will come into play. The applications must become thinner, even if the clients don't.

*Doug Haluza*
*Huntington, N.Y.*

Teletoons


I'm sorry, everyone... this U.S. District Court session is now adjourned. I have just been informed that Microsoft has bought the building.
Phil Frank

Phil Frank and Joe Troise baba@sfgate.com

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FEATURE

COME ABOARD AS TYCO SUBMARINE LAYS THE CABLE THAT WILL DOUBLE TELECOM CAPACITY BETWEEN THE U.S. AND EUROPE.

# Atlantic crossing

By Michael Csenger

*It could be a scene out of old sailing days — men toiling in endless circles as mile upon mile of thick black cable is loaded deep inside the C.S. Global Mariner for a new undersea link across the Atlantic. Nearly 9,000 miles of fiber will be coiled aboard a fleet of ships for the crossing, every last foot of it humped in place by hand, just as crews 200 years ago did with their own tarry cables and rigging.*

PHOTO COURTESY TELEGEOGRAPHY

**Global Mariner crew members** *load the optical amplifiers that will be installed every 38 miles along AC-1, shooting laser beams 9,000 miles through the trans-Atlantic fiber.*

As cold weather settled in the North Atlantic last October, Tyco Submarine Systems, Ltd. (TSSL) embarked from Long Island, N.Y., on its Atlantic Crossing (AC-1) project. Currently, the fiber's end is somewhere in the mid-Atlantic, and the plan is to reach England by this May. A second line is to be finished in November and will complete a ring that includes Germany and Holland. With four fiber pairs carrying 10G bit/sec of traffic each, the system will double the existing capacity between the U.S. and Europe.

Visiting TSSL's operations on the banks of the Piscatagua River near Portsmouth, N.H., where the cable is manufactured and loaded onto ships, is a step into military/industrial protocol. Portsmouth locals aren't exactly sure what the place is about. "We see those big cable boats go by and wonder what they're up to," said a local brew pub master. "It's like Oz to us — no one knows what goes on behind that big curtain."

### The scale of it

Our waters are spanned by nearly 200,000 miles of fiber optics, almost enough to reach the moon. TSSL put nearly all of that "wet plant" in the water. Accounting for roughly 85% of Earth's installed base, the company has spun more fiber and built more undersea systems for carriers and the military than any telecommunications vendor in the world.

In April 1997, TSSL acquired AT&T's undersea division, including a fleet of six cable-laying ships, making it the world's largest builder of undersea cable systems and the only one that handles everything from cable design and production to installation and long-term management.

TSSL boasts to have laid enough fiber to circle Earth's equator six times, yet still there's not enough. Demand for undersea communications is growing at anywhere from 30% to 90% annually, depending on whom you ask. Data traffic from global Internet service providers accounts for most of the new demand, especially on the heavily loaded trans-Atlantic and trans-Pacific routes leading to and from North America.

The 477-foot-long Global Mariner is TSSL's newest ship, launched in 1992. Its two main cable tanks together hold up to 1,250 miles of cable, depending on the type. Three auxiliary tanks bring the total capacity to more than 3,240 miles, not including odd lengths of ground rope — old junk cable that comes in handy at sea.

Cables are spliced together in sections that vary from double armor near the coast to light wire in the deepest midocean. In Portsmouth, Global Mariner was being loaded with 700 miles of cable, its maximum weight-load for this particular trip, comprising more than a dozen different sections in each tank in order to accommodate the different seabed conditions along its route.

Altogether, AC-1 will involve five ships making multiple trips. "We'll be loading cable literally nonstop for the next seven months for this project," says Norm Coltanovich, TSSL's director of cable operations.

### Glass wars

You may wonder what doubling the trans-Atlantic capacity will mean to the cost of international phone service. "We'll see an enormous rate reduction," says Len Elfenbein, president of Lynx Technologies, a consultancy and publisher of a worldwide guide to telecommunications services, based in Little Falls, N.J. "I believe rates across the Atlantic will drop at least 30% to 40% over two or three years."

Global Telesystems, Ltd., the company that owns AC-1, already discounts the cost to carriers of bulk capacity on the new trans-Atlantic link by at least that much, he says. "They're

*Continued on page 52*

hum

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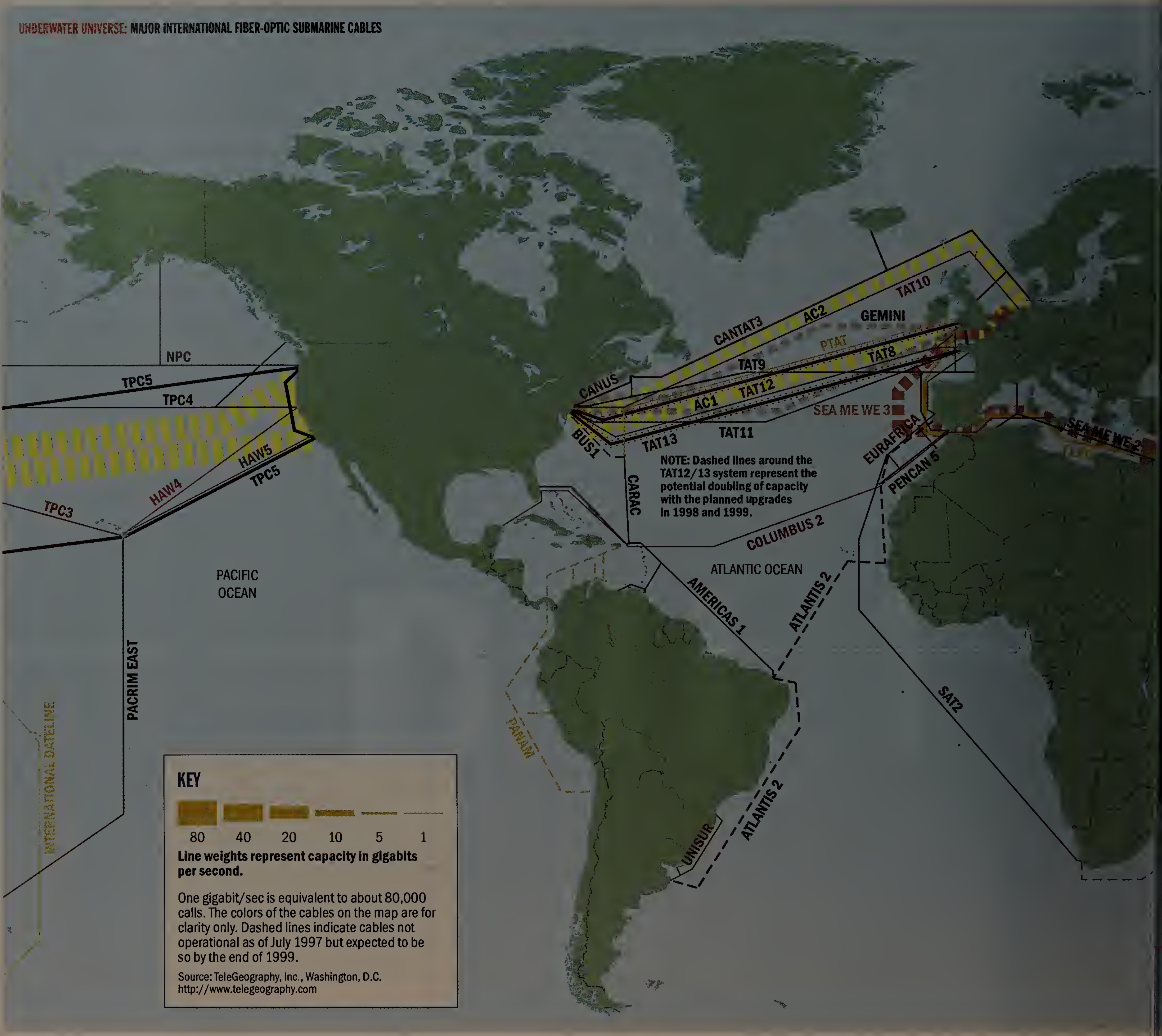


UNDERWATER UNIVERSE: MAJOR INTERNATIONAL FIBER-OPTIC SUBMARINE CABLES

NOTE: Dashed lines around the TAT12/13 system represent the potential doubling of capacity with the planned upgrades in 1998 and 1999.

**Line weights represent capacity in gigabits per second.**

One gigabit/sec is equivalent to about 80,000 calls. The colors of the cables on the map are for clarity only. Dashed lines indicate cables not operational as of July 1997 but expected to be so by the end of 1999.

Source: TeleGeography, Inc., Washington, D.C. http://www.telegeography.com

*Continued from page 49*

selling capacity on AC-1 for less than the carriers can sell to carriers."

"I think you have to say this is going to inevitably alter the factors of supply and demand," says Gene Shutler, Global Telesystems' executive director. "That is essentially the plan," although he says the time period over which the change will take place is hard to predict. Trans-Atlantic lines aren't exactly oversubscribed, but some carriers always wind up running out of capacity on different cables around the world. AC-1's largest demand has come from ISPs, large, established players and start-ups jumping into the AC-1 opportunity.

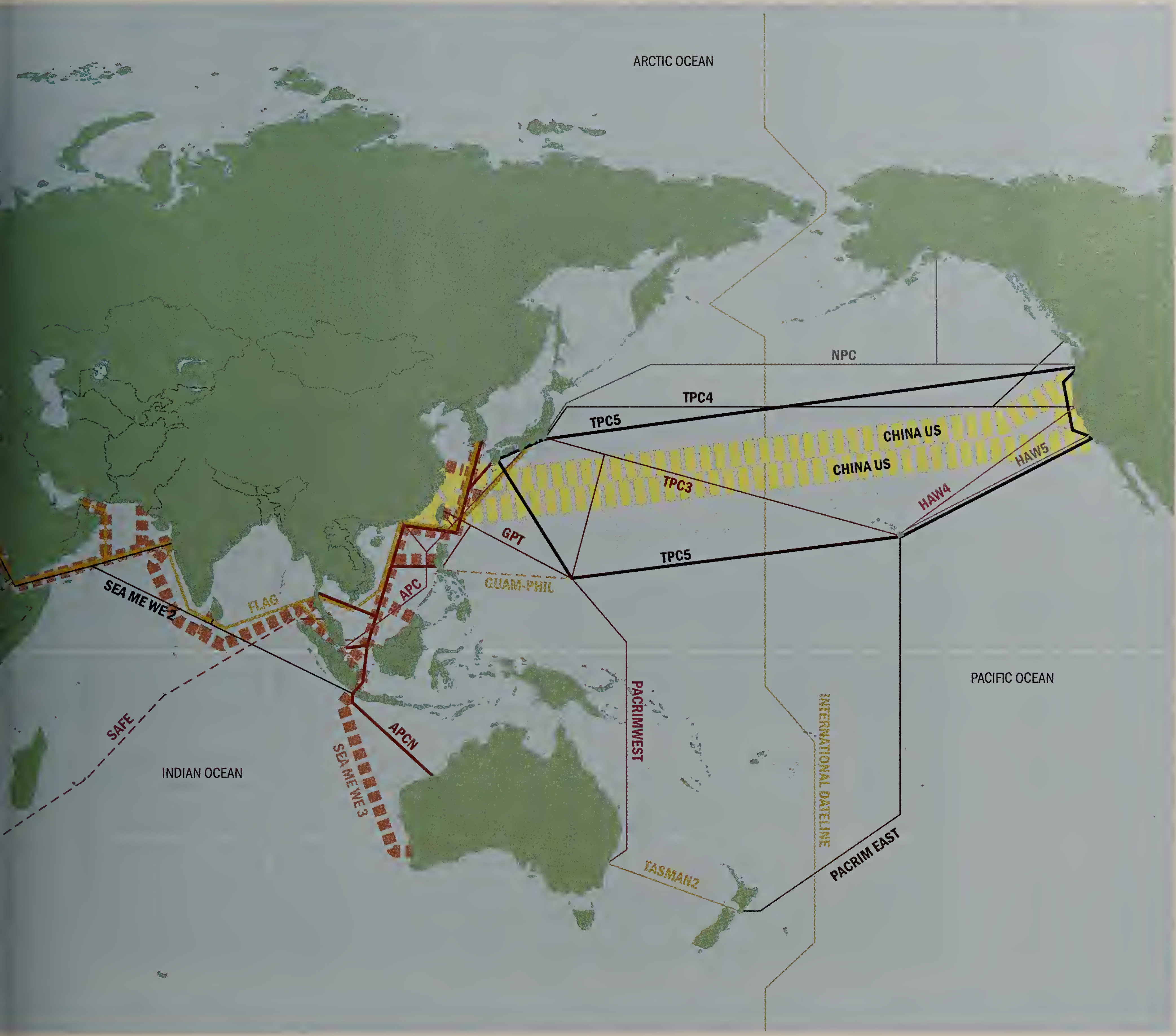
The Global Mariner's berth on the Piscatagua is connected to TSSL's fiber production plant on the river's high bank by a sloping cable shed several hundred feet long. Cable is drawn down a ramp and into the ship on rollers, then takes a bend onto the main deck and is fed into the ship's tanks.

The main tanks are about 30 feet in diameter and several decks deep. At 38,400 cubic feet each they're like squat shipboard silos. The walls are white, and the "floor" is many layers of black cable already loaded aboard. From an overhead catwalk, the two men working below look like small action figures hiking in circles on a vinyl record.

A dull metal cone, roughly eight feet in diameter at its base, rises from the tank's bottom to a blunt top. Cable is fed in above the cone, and the men walk it around, packing the stuff in a tight spiral. The line comes aboard at 3 knots, which is close to a city walking pace of 4 miles per hour.

It's like mall-walking in an igloo. The men keep up with the cable and guide it by hand in circles, starting tight against the cone and widening outwards to the wall, then spiraling back in again, one layer at a time. It takes 10 days or more to pack the ship. The loading is meticulous, tedious. Working day and night, the crew can handle about 50 miles of light cable per day. The heavier armored cable is more difficult to work with, averaging 25 miles per day.

Every 38 miles there is a sudden knot of action as the cable's optical amplifiers arrive. These repeaters



boost fiber-optic laser signals at specific intervals along the cable.

Repeaters are the heart of a long cable system. They are beryllium-copper cylinders about three feet long and 18 inches in diameter. Flexible rubber boots at either end give them the flexibility to sink miles down to the ocean bottom without kinking the cable. They resist pressures of around 4.5 tons per square inch, and the occasional curious chomp of big critters.

Repeaters are installed on the cable at the factory but can't be coiled into the tanks aboard the ship. Instead, it takes more than 20 crew members to manhandle the repeaters onto special racks on the main deck. Lifting the repeaters isn't a problem, but bending armored cable back into the tanks without kinking it is, and the whole loading crew turns out for this careful maneuver.

### Beach-head

The obvious place to look for a cable would be on the beach where it comes ashore. AC-1 lands at the town of Shirley, on Long Island.

Cable-laying begins with the ship idling a safe distance off the beach as the terminal end is towed ashore on a series of floats. A team of divers guides the cable into a trench leading to a manhole ashore, where a winch or bulldozer pulls it in. Once the end of the cable is secured on land, divers release the floats and the cable slips to the bottom of its trench.

The ship then heads off, towing a Sea Plow that furrows a three-foot-deep trench to protect the cable. Off the continental shelf, in midocean, the cable simply lays exposed on the bottom.

When the first ship lays all its cable, another ship comes along and splices on the next length. This is done in two ways. If conditions are reasonably calm and strong currents or approaching storms aren't an issue, the cable can be dropped and marked with a huge midocean buoy. Several of these yellow buoys wait like enormous juggling props at the bottom of a round hole three decks deep in the Global Mariner's aft hold.

Topped with an array of radio transmitters and radar beacons, the buoys ought to be big enough to find anywhere. But TSSL's Coltanovich doesn't like to use them. "Buoys will get moved in a storm and take the cable with them," he says. "Then either the cable or the buoy line breaks, and we have no idea where the cable is anymore."

Grappling is the preferred operation — just let the cable go, and later use a big hook to literally snag it up from some 20,000 feet down. Exact navigation is the key, using the Global Positioning Satellite system to chart where the cable was dropped. "We put a couple of kilometers of ground rope on the end of the cable, mark the spot, and then the next ship just grapples it up," Coltanovich says. "They generally snag it on the first try."

In the buoy hold is a collection of odd ropy things hanging down like long rubber spirals. They're cable stoppers that are used to deal with the end of a cable and hold it alongside the ship while attaching buoys and ground rope to it. Simply wrap a good length of cable stopper around a cable, and the harder you pull, the harder it holds.

### COAX CABLE AND FIBER FACTS

**Today's undersea cable systems are designed to last for 25 years. The first trans-Atlantic cable was a telegraph line laid between Ireland and Canada in 1858. It lasted for three months, performing horribly until it died. The signal was so weak and indistinguishable from the Earth's background field that it took hours to send a few words. Each character had to be sent and resent until a team of three operators could make a majority guess as to what it was. The cable owners finally tried to fix things by boosting voltage from 600 to 2,000 volts, melting the cable's insulation and leaving it dead in the water after carrying a total of 732 mixed messages.**

**The first trans-Atlantic telephone cable, laid in 1956, was called TAT1. Simplex (now TSSL) was the manufacturer of the American portion of that cable. A series of larger and more sophisticated coaxial telecommunications cables were laid through 1983. TAT7, laid in 1983, had a capacity of only 4,246 circuits, yet will continue in use through the year 2008. TAT8 was the first trans-Atlantic fiber-optic cable, laid in 1988 by TSSL.**

#### Costs and risks

It used to be that carrier consortia built their own cable systems, dividing capacity among themselves. But over the past 18 months or so, a trend has developed as new systems are privately funded and their capacity sold to the carriers. Global Telesystems is a major player in this new order of things.

Capitalized by investors that include the AFL-CIO pension fund and other large institutions, AC-1 is Global Telesystems' first major project.

Negotiations between Global Telesystems and TSSL started in late 1996. Less than a year later, cable was already in the water. About a month before installation began the system was reconfigured to add a shore drop in Holland. "It's a pretty good indication of the new business model overtaking this industry," Coltanovich says. "In the old days it would've taken a couple of years to hash things out, never mind last-minute changes."

The underlying technology also is subtly changing. Wave division multiplexing (WDM) is the key to upgrading fiber capacity. "It used to be that repeaters limited your upgrade," Coltanovich says. "You had to go and change the wet plant to increase capacity. But now with optical amplifiers you can go from 2.5G to 5G to 10G by just changing the end stations."

This capacity doesn't come cheap. The AC-1 contract value has not been announced but can be estimated. A different consortium last year completed the most ambitious cable project ever, the Fiber Link Around the Globe (FLAG) system. FLAG runs from Europe to the Middle East and around Asia and the Pacific. It spans more than 17,000 miles and cost $1.5 billion to deploy.

Assuming an equivalent cost of roughly $86,400 per mile, AC-1's 8,750-mile price tag should run about $756 million. Neither TSSL nor Global Telesystems would confirm the figure, although sources say the costs of building systems on such a scale are fairly similar across the industry.

Global Telesystems has funded some smaller projects around the world, and already is planning a Pacific crossing similar to AC-1.

The Pacific is jammed, says Michael Hewitt, a submarine systems analyst at Information Gatekeepers Consulting, Inc., in Boston. "There's not as much total bandwidth demand across the Pacific, but the available capacity is pretty full. The carriers I've talked to are putting WDM on all their links to squeeze out whatever capacity they can."

Global Telesystems' Shutler says the company's plans for a Pacific crossing are based more on potential demand than current bottlenecks. "Cable projects still have long lead times; you have to be able to anticipate demand, not wait for it to show up," he says.

#### At sea

Out in the Atlantic, the cable is fed out of its hold by Linear Cable Engines (LCE), the same contraptions that helped feed it in. These pneumatically powered systems look like a convention of go-cart wheels all lined up in sets of six tires each, three on the top and three on the bottom. Forty-two wheels drive one LCE, gripping the cable and feeding it along without ever letting it slip. Articulated suspension lets the system handle thicker splices and repeaters without losing its grip. If a cable ever slipped overboard out of control, it would become an expensive pile tangled with pieces of the ship.

The cable-laying system also includes "dynamometers" that monitor tension on the cable, adjusting the strain so it doesn't snap from wave surge or from the sagging of its own weight.

At sea, cable operations are planned almost to the minute. The ship's navigation has to account for the different sinking rates of each section of cable, which will land on the bottom according to its weight, water depth and the speed of the ship. The goal is to leave enough slack on the bottom when crossing undersea peaks and valleys so the cable won't chafe or be drawn taut. Maximum cable-laying speed is 8 knots, and the LCE typically runs about 3% faster to ensure adequate slack.

Experienced crew down in the cable tanks shepherd the cable along as it whips up and away at about 800 feet per minute. It flashes out of the tank in a winding curtain, the men timing their step in and out of its orbit to retrieve pieces of wood and rubber dunnage that's used during tanking to smooth out lumps in the load. "It'll knock you out if it whacks you," Coltanovich says. "We don't send just anyone down there when the cable's moving."

Depending on water depth and other factors, the cable may touch bottom up to 20 miles behind the ship. So when changing course or adjusting speed, it can take half an hour before the change actually impacts what's happening behind on the ocean floor. These details are planned before the ship leaves port, and have to be orchestrated in real time around changing wind and sea conditions.

#### Hostile ground

Planning cable routes is a meticulous affair. AC-1 is the eighth system to cross the Atlantic along basically the same U.S.-to-England route, separated from existing systems by just over a mile in places. The entire route is mapped anew by TSSL's deep-water surveying ships for any crossing. "We know the lay of the land pretty well, but you never know how it might've

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changed from one season to the next," Coltanovich says.

Underwater bottom-slides can wipe out existing terrain in a flash, and cables have to be laid in an exact path through rubble fields and underwater mountain passes. The mid-Atlantic rift is a geological challenge that only can be dealt with by careful mapping, precise navigation and cable placement accurate to within yards.

The day-to-day problems happen closer to shore. Continental shelves — the bottom terrain that slopes gradually from our beaches to the clifflike edge where deep ocean begins — can extend 100 miles out to sea. Fishing trawlers drag their nets along the bottom on the continental shelves, and ships drop their anchors, accidentally snagging a cable and either snapping or damaging it internally. The most heavily armored cable and fail-safe operations go into the "last mile" from the edge of the continental shelf onto the beach.

Hong Kong is the worst maritime shore for undersea cables. The surrounding approaches have a very soft seabed on which unregulated cargo ships drop anchor wherever they please. Their anchors weigh tons, and will carry down through the bottom to a depth of 20 feet. "In a storm these ships will drag anchor, snag your cable and yank it as far as it'll go until it breaks," Coltanovich says.

The coast of Alaska has king crab pots about 10 feet square dropped to phenomenal depths 100 miles from shore, and also dragged around by winter storms. Off the Atlantic coast around New York, fishing trawlers drag the bottom as far as 90 miles out to sea, right up to the edge of the continental shelf.

**Get more online:**

- ○ **Explanations of how undersea fiber-optic cable is constructed and what happens when it breaks.**
- ○ **The AC-1 homepage and TSSL info.**
- ○ **TeleGeography, Inc.'s site, an independent publisher of reports and maps on international telecommunications and the global information economy.**
- ○ **The International Cable Protection Committee's Submarine Cables of the World site, a central access point to online submarine cable protection information and tools for cable planners, cable owners, and other users of the sea bed.**

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In each case, the only protection is to bury armored cable as deeply as possible under the seabed. TSSL's Sea Plows are towed behind the cable ships and use a contraption of water jets to bury cable about three feet into the muck. Sea Plows can be used in water up to about 5,000 feet deep. Around Hong Kong, TSSL rigged a barge with remote water jets to cut a trench 30 feet deep in the soft mud, and buried its cable within.

For all the invigorated competition, "It's a small universe of people who can actually drop these systems on the bottom of the sea," Coltanovich says.

"We actually built some of the FLAG system cable and loaded it for them, so we had a chance to see what they've got onboard and it's all the same basic stuff," he says. "The real differences between us are in how we handle the problems that come along."

Twenty thousand feet down, those are (not quite) problems of another world.

*Csenger is a freelance writer based in the Chicago area. He can be reached at mcsenger@mcs.net.*

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REVIEW

NETSCAPE'S LATEST PROXY SERVER BEATS MICROSOFT'S, BUT THE EXTRAS IN BOTH PRODUCTS MAY GIVE YOU CONFIGURATION AND MANAGEMENT HEADACHES.

# Netscape has the proxy edge

*By Joel Snyder*

*With the new versions of their Web proxy servers, Microsoft Corp. and Netscape Communications Corp. are basically asking you to shoot a fly with an elephant gun. Both Netscape Proxy Server 3.5 and Microsoft Proxy Server 2.0 adequately perform the basic functions proxy servers are supposed to handle: delivering copies of frequently accessed content from cache, rather than downloading it across the Internet; authenticating Internet access; and filtering out some forms of unwanted content, such as Java applets.*

## Score Card

| | Netscape Proxy Server 3.5 | Microsoft Proxy Server 2.0 |
|---|---|---|
| **Management interface (25%)** | 8 x .25 = 2.00 | 5 x .25 = 1.25 |
| **End user ease-of-use (20%)** | 8 x .20 = 1.60 | 7 x .20 = 1.40 |
| **Security (20%)** | 7 x .20 = 1.40 | 9 x .20 = 1.80 |
| **Documentation (15%)** | 8 x .15 = 1.20 | 6 x .15 = 0.90 |
| **Pricing (10%)** | 5 x .10 = 0.50 | 7 x .10 = 0.70 |
| **Platform support (10%)** | 8 x .10 = 0.80 | 5 x .10 = 0.50 |
| **Total score** | 7.50 | 6.55 |

**Individual category scores** are based on a scale of 1–10. **Percentages** are the weight given each category in determining the **total score.**

However, the products go beyond these fundamental requirements with a number of extra features. While you would normally figure that's a good thing, many of the features add little or no benefit and make the proxy servers harder to configure and manage.

Microsoft went further than Netscape in this approach and becomes a prime candidate for the most misnamed product of the year award by bundling in a number of firewall features, including advanced packet filters and an IPX-to-IP gateway. Microsoft would have been better off simplifying its proxy server management, improving documentation and providing more detailed reports to help you improve performance.

In Netscape's case, the new release gives you predictive and distributed caching techniques that could add more to your administrative overhead and network cost than they're worth. Putting the feature creep aside, though, Netscape is the more solid, mature and easily managed of the two.

### Basic differences

The differences between the two products, however subtle, start showing up in their architectures.

Microsoft's has to run on the same machine as the company's Internet Information Server (IIS). This limits Proxy Server 2.0 to running under Windows NT Server 4.0 and means it inherits all the bugs and security problems in NT Server and IIS. Netscape's product can run on a stand-alone server under a wider array of operating systems, making it more flexible.

Moreover, Microsoft's offering ties you into the authentication database in NT Server, while Netscape's can use its own flat file database or a new Lightweight Directory Access Protocol (LDAP) link to an enterprise directory. Netscape gets the edge here when you consider that NT Server's authentication system doesn't scale very well and the LDAP link in Netscape's product enables you to hook into multiple directories.

The two vendors take different approaches in how they offer their excess features. Using Microsoft's heavily touted active Web caching feature, Proxy Server 2.0 examines historical usage trends, predicts which Web pages users are most likely going to request on which days, and downloads them beforehand. Netscape's on-command caching attempts to meet the same goal of having pages in cache before they're needed, but forces you to manually load the URLs for those pages.

In our view, both features offer little benefit in a production environment. For all the time it takes to set up the features and download the pages, you'd be just as well off letting the proxy server cache them on its own. After all, the only user who benefits from having a page prefetched is the one who initially requests it, and even then the savings is only a few seconds if you have T-1 or higher-speed Internet access.

Both vendors also tout their ability to support a large array of proxy servers that can check each other's caches for pages before submitting requests to the Internet. For instance, if a server does not have a requested page in cache, it will check to see if the page is on any of the others in the array before retrieving it across the Internet.

Again, our review indicates that implementing these proxy server arrays is too much work for the benefit and adds to your ongoing management headaches. The pain of keeping all the caches in synch just to retrieve a few pages across your internal network rather than the Internet isn't worth it in the vast majority of cases.

### Netscape pulls ahead

Once we got beyond examining basic functionality, Microsoft's product started showing flaws and weaknesses. The first hiccup came in testing both products' autoconfiguration feature, which is supposed to make it easier to modify proxy server preferences and options on all your

## Net Results

| | Netscape Proxy Server 3.5 | Microsoft Proxy Server 2.0 |
|---|---|---|
| | *Netscape Communications Corp.*<br>*www.netscape.com/comprod/server_central/product/proxy/index.html*<br>*$525 for 50 users, $5 per additional user with a 1,000 user maximum per server; free for educational institutions* | *Microsoft Corp.*<br>*www.microsoft.com/proxy/*<br>*$995 for unlimited users;*<br>*$595 for educational institutions* |
| **PROS** | ▲ Easy to install, configure, manage and use<br>▲ Provides good reports for tuning cache performance | ▲ Supports some firewall functions<br>▲ Easy to add third-party plug-ins |
| **CONS** | ▼ Could benefit from automatic management for performance tuning and event alerting<br>▼ Access control list editing functions could be improved | ▼ Barely adequate documentation<br>▼ Clumsy user interface<br>▼ Difficult to use in firewall environment<br>▼ Hard to manage |

browsers. With autoconfiguration, the proxy server creates and stores a file that lists all the proxy servers in your network, the protocols they support and the various rules regarding what should be proxied and when.

The proxy server generates a URL for that file. You then have to enter the URL in all your browsers, but this needs to be done just once. Every time a browser is launched, it uses the URL to check the file on the proxy server and downloads a new copy if it has changed.

While both vendors' proxy servers built their own autoconfiguration files and gave them URLs, Microsoft's product never delivered its file to the browsers. This was due to a communication problem between Microsoft's proxy server and IIS. The proxy relies on IIS to deliver the file — and any cached files for that matter — to the browser.

We contacted Microsoft technical support about the problem but couldn't get an answer before press deadline. As a result, we had to manually configure our browsers to use Microsoft's proxy.

Netscape's autoconfiguration feature worked the first time and didn't have a complicated and overly long URL, as did Microsoft's. All we had to do was type the short autoconfiguration file URL in the browsers and we were done. The proxy server handled the rest.

When it comes to security, Microsoft Proxy Server 2.0 offers features you'd find in a firewall, but oddly it is missing some of what you'd expect in a proxy server. At a minimum, you want a proxy server to require authentication before permitting users to surf the Internet. The proxy also should enable you to restrict or block access to specific sites, filter out certain types of content, such as Java applets, and scan for viruses.

Both Microsoft and Netscape offer authentication options with approximately the same level of granularity. However, Netscape's access-restriction features are more flexible. For example, we were able to grant specific users access to certain Web sites and block access to other sites. Netscape also enables you to build your own Access Control List (ACL) file, which is a chore, but it does enable you to block access to specific sites.

Microsoft does not support ACL files, opting instead for loading in lists of sites found in third-party access-restriction products such as Microsystems Software, Inc.'s Cyber Patrol. While Netscape also will read in restricted site lists from third-party products, neither vendor supports time-of-day restrictions that would enable you to open restricted sites for after-hours access.

Netscape includes what is needed to filter out specific parts of Multi-purpose Internet Mail Extensions (MIME) e-mail messages and HTML objects such as Java applets, ActiveX pages or JavaScript routines. Netscape Proxy Server 3.5 also can filter outgoing traffic based on packet header information and will pass incoming files off to a preinstalled third-party plug-in for virus scanning.

## *How We Did It*

We ran both proxy servers on a Microsoft Windows NT 4.0-based server with Service Pack 3 and judged them for ease of use, management and control capabilities, security, documentation, and reporting. After configuring both products with similar security rules, we used them to support our lab staff's Web usage for one week each. In the middle of each week of testing, we tapped the management reports and traffic statistics that the products provided to tune their caches for better performance.

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Microsoft, on the other hand, requires installation of third-party products to filter out MIME parts, Java applets and ActiveX pages. It also defers virus scanning to an extra cost plug-in. However, Microsoft makes it easy for users of a plug-in subscription service to download those third-party products via hot links built into Proxy Server 2.0.

While it's true that Microsoft leaves Netscape at the gate when it comes to firewall features, we question whether you would want to mix proxy server and firewall functionality in one product, especially one from Microsoft. For one thing, building a complex firewall on top of NT is no day at the beach, given the problems in NT's TCP/IP stack. Just as important, putting firewall and proxy server functionality on the same server forces one machine to implement internal and external access policies that can be at odds with each other. For instance, in steeling your network against external intruders, you may be unable to deliver the type of performance that internal users want.

Still, as a dual-homed host that has separate interfaces to your local network and the Internet, Microsoft Proxy Server 2.0 will handle Web caching, plus do some smart packet filtering, application-level proxying, act as a SOCKS 4 or WinSock proxy, and provide a gateway for getting IPX traffic onto the Internet.

Microsoft loses points for its product's generally weak documentation. While Microsoft matches Netscape in providing step-by-step instructions to get things rolling, Netscape gives additional depth at every stage. For example, one of the key issues in configuring a proxy server is how large the cache should be. Netscape provides a tutorial on caching, cache performance and cache sizing to help you optimize your cache for performance. Microsoft leaves you high and dry, with nary a word on cache optimization.

**Go online for:**
- ○ **A quick introduction to Web caching**
- ○ **A more detailed white paper describing proxy servers**
- ○ **Links to other commercial and shareware proxy servers**

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Netscape also provides a more stable browser-based management interface, which enables you to easily retrieve cache hit rates, response-time measurements, traffic patterns and usage levels. Coupled with easy-to-find help, Netscape's proxy server is easier to tune than Microsoft's.

The applications to manage Microsoft's product had their problems, too. We had to fight crashes when Internet Explorer was reading help files, lockups when we then tried to restart the Windows NT-based Microsoft Management Console, and confusion in trying to tap into NT's Performance Monitor to look at performance numbers. When the applications were working, things weren't much better. For example, we couldn't find out easily what our cache hit rates were or what kind of data was being cached.

So if you want the more solid and easily managed product, get Netscape Proxy Server 3.5. However, understand that both offerings may have much more than you'll ever need and that is going to make your management of either one more complex and expensive.

*Snyder is a senior partner at Opus One in Tucson, Ariz., where he specializes in networks and communications systems. He can be reached via e-mail at jms@opus1.com.*

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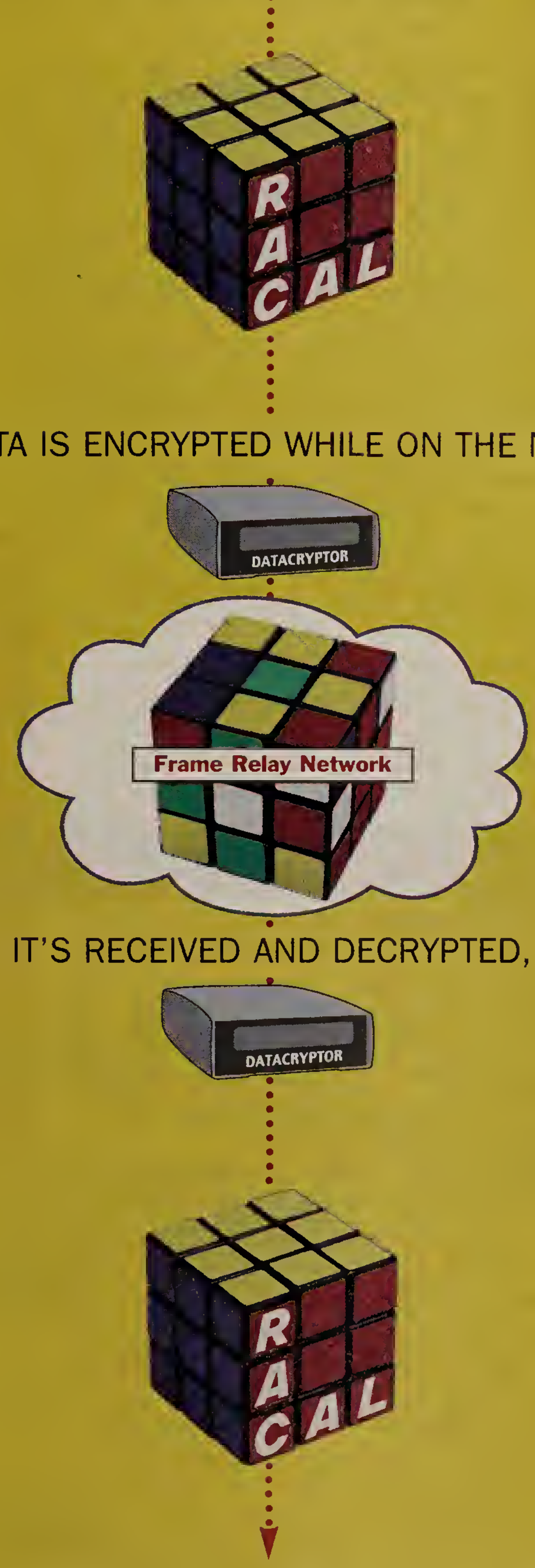

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*Circle Reader Service* #**22**

# Long night on the net watch

*Continued from page 1*

As the clock ticks toward midnight, the telephones are jumping at the South Jacksonville network operations center (NOC) of CSX Technology, Inc., the IS arm of the parent company.

Tonight is full house night — meaning Snider is on duty along with Michael Kaiser and Alvin Sutton, his fellow graveyard shift workers. Two network analysts usually monitor the worldwide corporate data network on the third shift, but schedules overlap on Thursdays and three workers are present.

Williams, manager of network operations, just happens to be on hand logging in an overnight stint to show support for his staffers. Snider tells him that a check of the circuit indicates the line is fine, so the two turn their attention to the relevant IBM IDNX multiplexer port. But they come away confused because it, too, checks out.

Williams is convinced the dispatcher has identified the wrong node, and he dives headlong into a printout that lists the circuits and IDNX nodes in question.

Sure enough, Williams finds the problem. "They gave us the wrong ID. We should be looking at Node 19, Card 4, Port 40," he says. Snider recycles the multiplexer port and the problem is solved — for now.

It's been hopping in the data center since the third shift came on at 11 p.m. Kaiser is hunched over a NetView display checking reports of poor line quality on a circuit leading into the company's West Jacksonville rail yard. And Sutton is preening trouble ticket notifications, closing out some and making mental notes to keep an eye on others through the night.

### Off hours have their benefits

Separately, the graveyard shift workers confide that they like the off hours. "I never have to fight for a parking space close to the building, and I don't hit traffic on the way in," chuckles Kaiser, a bachelor who's spent nearly 18 months on the overnight shift.

Still, all three admit the odd hours take their toll on personal lives and relationships. Snider, a retired Navy communications technician with a 13-year-old daughter at home, has worked the third shift for 11 months. His 20-year-old son and daughter-in-law also live with him.

Working nights impacts your social life, Snider says. He is divorced and just started dating again after almost a year because the late shift makes it hard to meet people.

"I laid it on the line with my friend the first night that I live a different life, a different schedule," Snider says. "We've managed to work it out."

Kaiser says the night shift influences how you spend time with friends. If a group opts for a late dinner, you might go, "but you're not going to do any drinking if you have to be at work in a few hours," he says.

But the night hours do have their perks, Kaiser adds. An avid golfer and surfer who has a house on the beach, Kaiser says his work schedule affords him the opportunity to hit the links when rates are less expensive and the courses when they're a lot less crowded.

### There's no sleeping on the job

Nearly all the graveyard shift workers say they grab sleep in bunches — four or five hours when they arrive home and often a long nap before they head in for their shift. The most difficult aspect of the tour is returning to work after two or three days off, Kaiser says.

"Your body adjusts to being on days again, and that first night back is rough," he says. "Sometimes you fight to stay awake; I pray for a busy night to keep me going." His workmates agree.

Sutton, a network management specialist with two years invested at CSX and 15 months on overnight shifts, says the third shift has worked well for his family. Sutton's wife works days, leaving him to drop off his 5-year-old son, A.J., at school and pick him up in the afternoon. Sutton sleeps in between.

"We've still got evenings together and we take meals as a family and talk," says Sutton, a former Navy electrician. Snider and Kaiser also are military veterans, which they say gives them the discipline and stamina for working nights. Days off rotate every three months, which may mean the family takes in a movie at a theatre on weeknights, Sutton says.

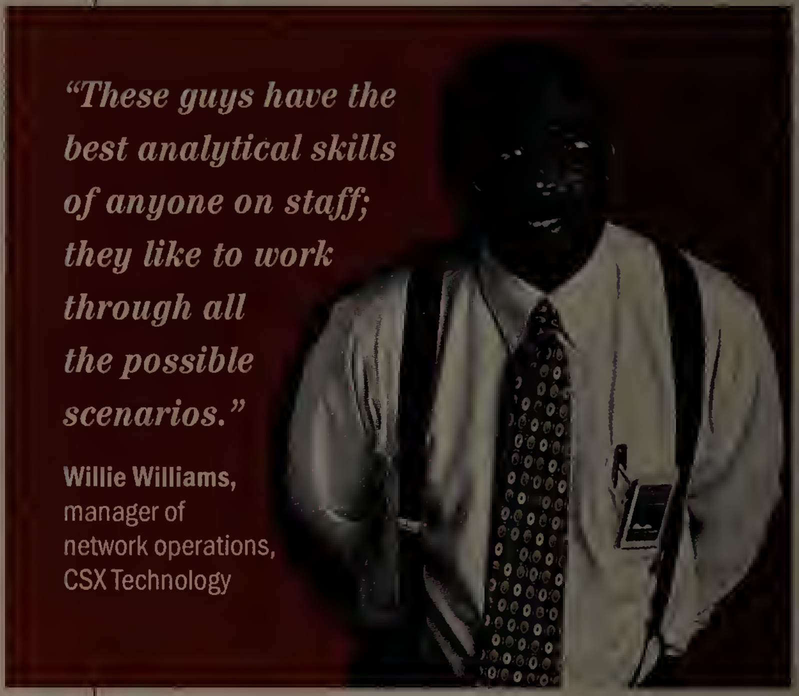
"Third shift is definitely the hardest on the family life, but it's great for building your work skills," Sutton says. The slower pace gives analysts more time for training and teaching themselves new systems. "Within seven months of working nights, I was able to run the shift by myself," he says. By contrast, day counterparts are so swamped with calls that they seldom have time to cross-train and need to rely on each other for troubleshooting help, Williams says.

### Should we wake 'em?

It's 2:10 a.m., and the NOC has quieted down. Sutton is using his NetView screen to check a trouble ticket for a site known only as Z6, which is reporting a "no line signal" error on a downstream circuit. He notes that the carrier is testing the line.

There's not much more he can do at this hour, unlike his daytime brethren, who often can call users and get them to report what they see on their end of the situation. "We work blind and we go by what our experience tells us," Sutton says.

About an hour later, out in a courtyard under the stars, Snider takes a long drag from his cigarette and backs up Sutton. The staff occasionally wakes up third-level engineers or managers, but they'd better have a good reason for doing so, he says. There's much more pressure on overnight workers to firefight trouble spots using the information at hand. However, if a router or T-1 goes down and business activity is threatened, standard procedure calls for them to notify IS executives at any hour.



*"These guys have the best analytical skills of anyone on staff; they like to work through all the possible scenarios."*

**Willie Williams,**
manager of
network operations,
CSX Technology

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As the clock ticks on into the night, Sutton talks about guarding against loneliness and the toll a late shift can sometimes take.

"It can be depressing if you're not careful," he says. "But it's a matter of perspective — I know I'm not doing this for 15 or 20 years." In fact, this night is one of Sutton's last before he moves to the day shift — a change brought on by a new analyst who currently is getting his feet wet on the day shift. Williams is transferring the new guy to nights so he can better hone his skills under the tutelage of Snider and Kaiser.

"I won't have much trouble getting used to days again," Sutton says. "My wife will be happy we're on the same cycle." But, he adds, his days will be much faster paced.

### Keeping them motivated

At 4 a.m., one of four mainframe specialists who share the data center heads off on a run to

### WORKING ON THE NIGHT SHIFT

**PROS**

- Workers avoid heavy rush-hour traffic
- Slower pace is conducive to skill building
- Days are free to pursue leisure activities
- Staff takes on additional responsibility and self-management

**CONS**

- Graveyard shift is tough on workers' personal lives
- It's difficult to return to work after a few days off
- Workers can't usually call clients for problem details
- Working off hours can be lonely

Dunkin' Donuts. Snider and Kaiser put in their coffee orders, and Williams springs for donuts for everyone, eliciting playful barbs from his staffers. Kaiser notes a circuit outage and begins to zero in on the hot spot when he sees the line is back up. "Probably just a power surge or line noise," he says.

Off in his fishbowl office at the back of the data center, Williams sets aside the personnel reports he's reviewing to talk about the demands of the third shift. "These guys have the best analytical skills of anyone on staff; they like to work through all the possible scenarios," Williams says. This is a product of their environment — they don't usually have access to users who file trouble ticket reports, he says.

Williams says it's important to give third-shift workers enormous amounts of responsibility and allow them to self-manage their work and processes. "If you don't do that, you take away their motivation," he says, adding that the three workers on his third shift "amaze me with the ideas they come up with."

Snider, for instance, has taken on the extra task of familiarizing himself with outdated remote access systems and has learned to make hardware patches for most of the boxes he picks apart. "If Walt sees a way to improve the remote access routines, he passes those ideas on to other shifts," Williams says.

Back on the data center floor at 5:15 a.m., Snider, Kaiser and Sutton are looking forward to shift change in less than two hours. "I'm out of here and then it's off to bed," Sutton says. "And for good measure, I'll unplug the phone."

*When he wrote this story, Bruno was enterprise editor for* Network World. *He now is managing editor of Publishing Products at The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at cbruno@tolly.com.*

**Go online** for more information about CSX Technology and what it's like to work the graveyard shift.
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*"Third shift is definitely the hardest on the family life, but it's great for building your work skills."*

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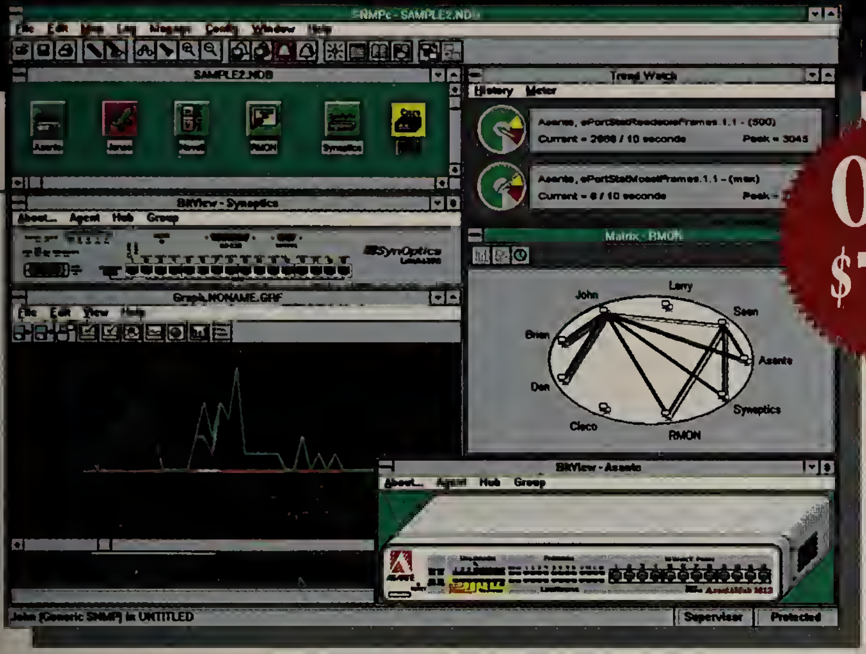

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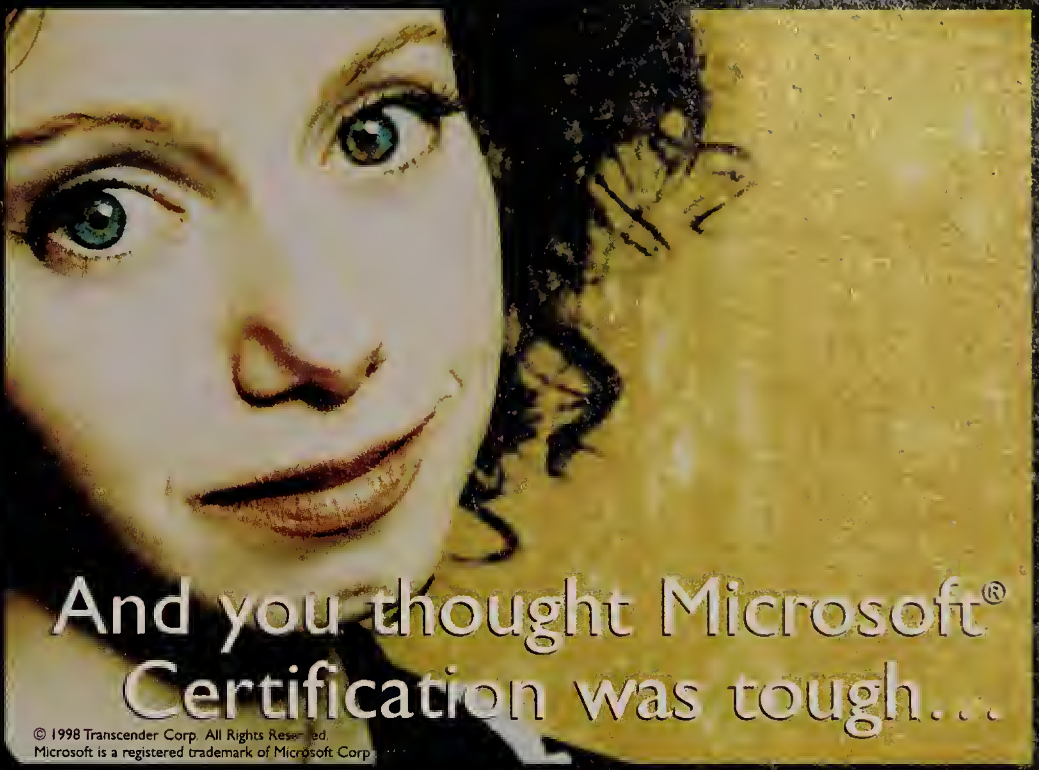
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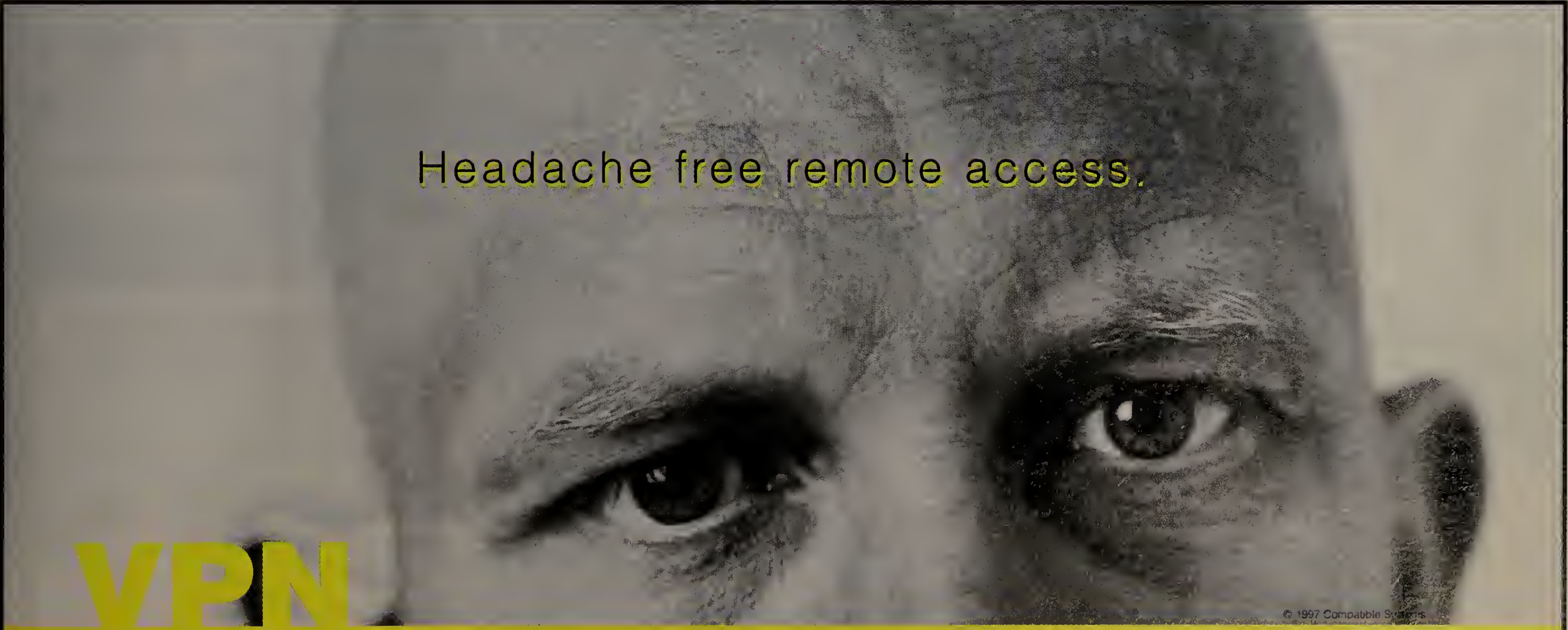

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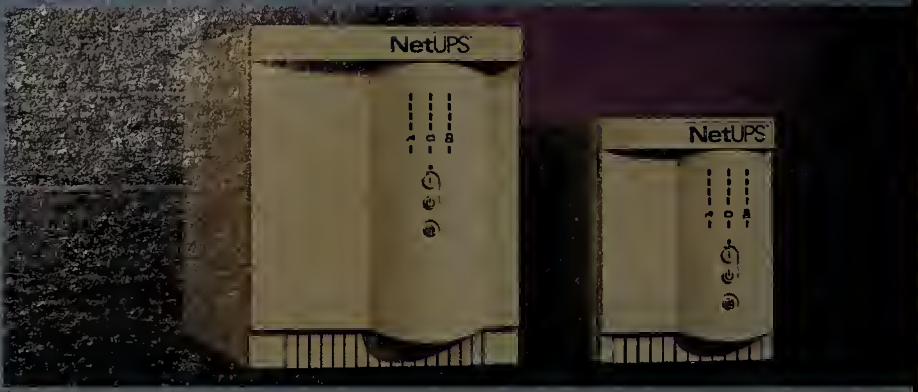

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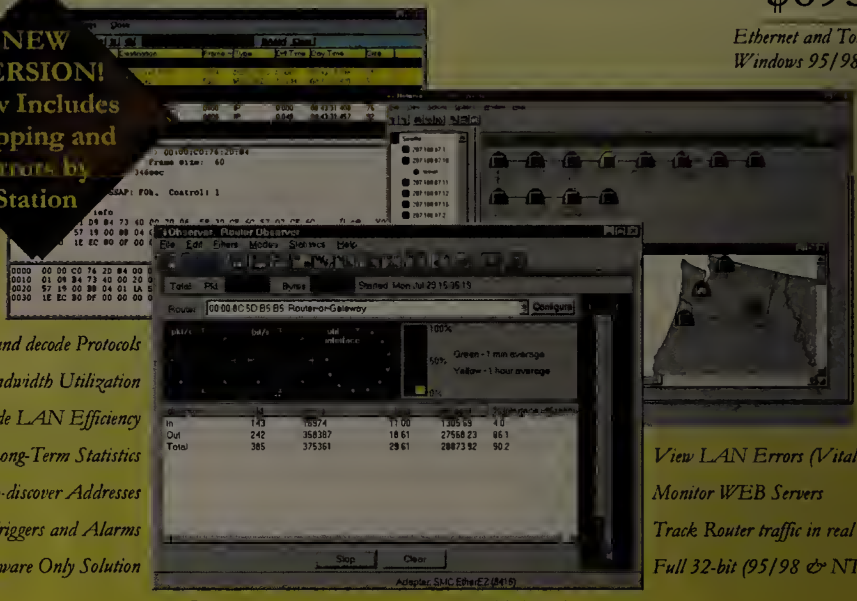
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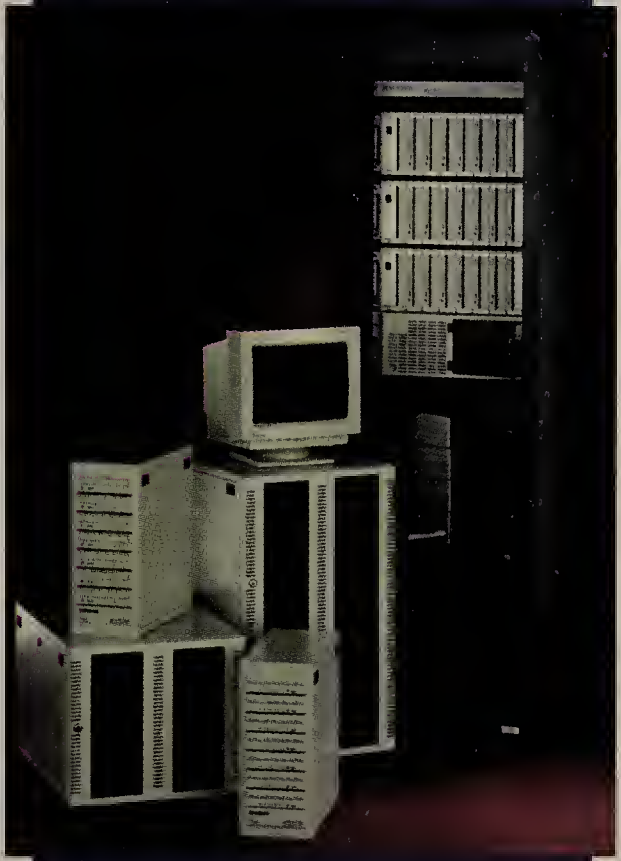

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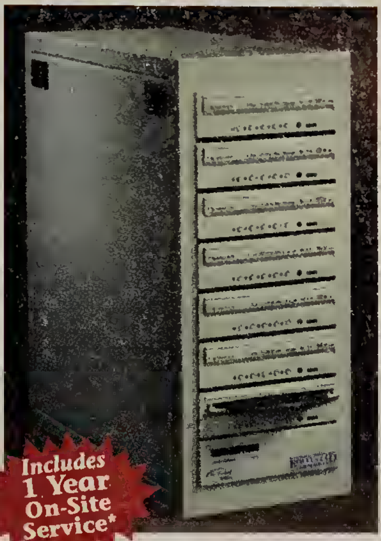

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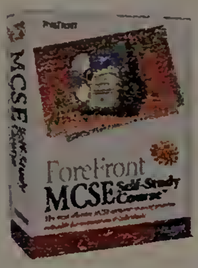

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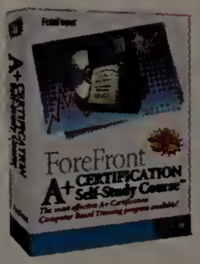

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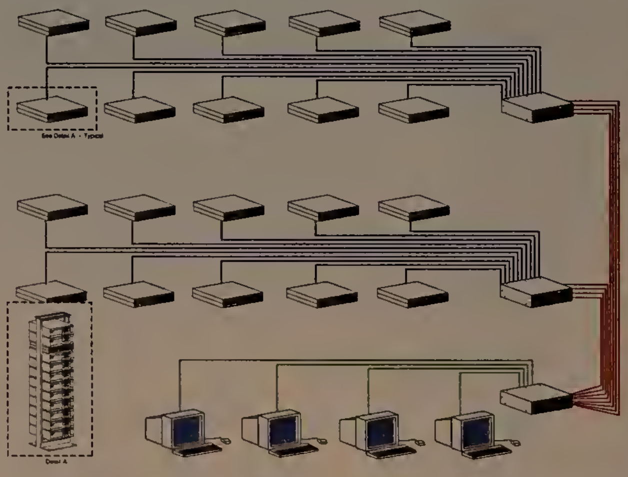

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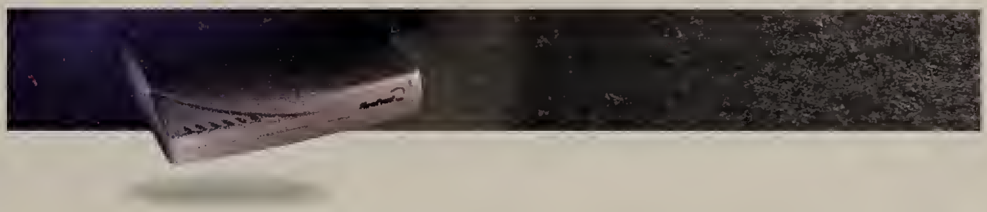

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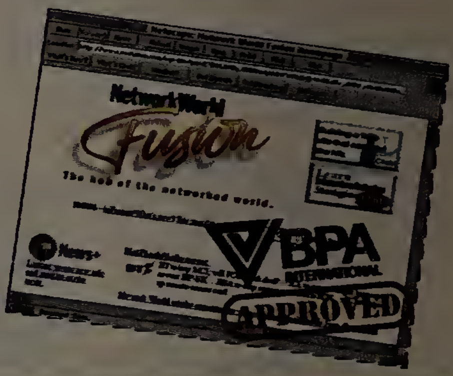

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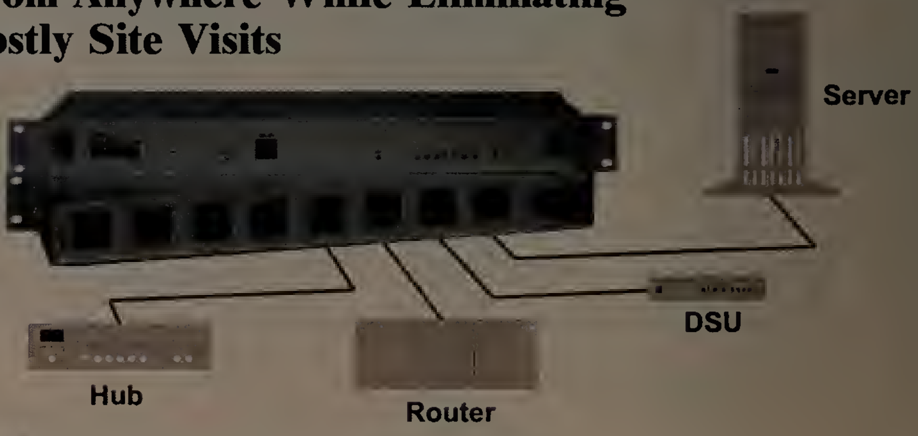

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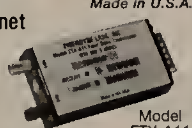

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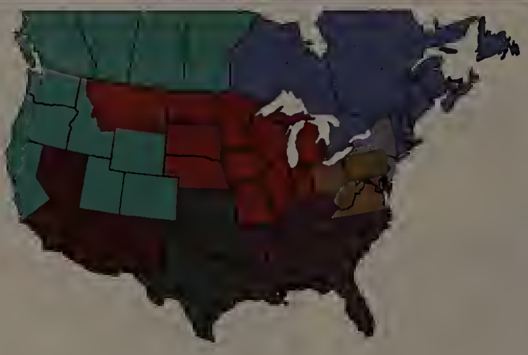

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## PCS

*Continued from page 12*

Tech Group was using Cellular One Group's analog services, but switched to AT&T for lower rates and better roaming capabilities, Tashman said. "We now pay 60 cents per minute for roaming in the 10 most western states where the other providers are charging $1 per minute," she said.

Tech Group is paying AT&T the same amount per month it paid Cellular One, but it is supporting 85 users in Arizona instead of 40, Tashman said.

Another plus of going with AT&T is that Tech Group did not have to sign a long-term contract. Cellular One did not offer Tech Group any flexibility in getting out of its contract. Since August the firm has been paying its Cellular One contract even though Tech Group is no longer using its services, Tashman said.

Analysts say that most users will find benefits with PCS providers now, but there are things to watch for.

Service providers such as AT&T Wireless and PrimeCo are offering users national coverage using a dual-band approach, Reeves said. Dual-band is a combination of PCS and cellular support using a single handset. This allows customers to reap the benefits of PCS features ssuch as e-mail and messaging while not having to worry about coverage when traveling across the U.S.

However, users need to evaluate how important some of those digital features are when roaming outside of their PCS network areas, said Dan Merriman, an analyst at Giga Information Group. Just being able to receive and make calls may be enough for some users, but if users are dependent on receiving their e-mail through their handsets, they need to seriously look at their carrier's coverage areas.

While some providers have combined their digital PCS and cellular networks to offer roaming, users can lose PCS' digital features when roaming into an analog network area. ■

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## E-comm

*Continued from page 1*

Corp. The certificates also allow the receiving party to confirm the sender's identity and make sure no one has tampered with the information.

The pilot is expected to run several months and will involve ABN AMRO North America, Inc., Bank of America, Citibank, Mellon Bank Corp. and Zions Bank. Each bank will use a public-key infrastructure (PKI) product set from a different vendor, such as IBM or Entrust Technologies, Inc. (see graphic).

### BANK BUDDY SYSTEM

**The following five banks are pairing up with different vendors of security products for a 'Net-based fund transfer test this spring.**

| Bank | Security product vendor |
|---|---|
| ABN-AMRO | IBM |
| Bank of America | VeriSign |
| Citibank | Entrust |
| Mellon Bank | GTE CyberTrust |
| Zions Bank | CertCo and Digital Signature Trust |

The banks will set up servers that can act as certificate repositories to validate and process signed payment requests off the Internet.

The banks will test interoperability among the products by exchanging information with one another. Eventually, the banks would like to become certificate authorities (CA), organizations that dole out certificates to 'Net users.

"The goal here is to define business practices for banks so they will understand what to do in this environment," said David Merritt, a vice president at Mellon Bank. "We don't have much experience with certificates."

The Internet banking pilot is being coordinated under the aegis of the National Automated Clearinghouse Association (NACHA), the Herndon, Va., group that sets the rules banks follow for using the ACH system.

"We're trying to develop some models for how to use the Internet for ACH payments," said Julie Foster, NACHA's director of network products.

"We may learn a lot about enhancements to the ACH network. For financial institutions, we'll be learning a lot about what it takes to make a business selling CA services," she said.

If the PKI products prove interoperable, then certificates could be seen as legitimate electronic commerce tools. If PKI products fail the interoperability test, then hopes for high-powered banking on the Internet could diminish.

Take Wells Fargo Bank, for instance. The bank already lets customers move money between their personal accounts using the Secure Sockets Layer protocol, which lacks user authentication capabilities. Wells Fargo also delivers its cash management reports to corporate customers via the 'Net.

But before the bank engages in sizable bank-to-bank transfers via the 'Net, "you need public-key encryption and digital signature certificates to ensure authentication and privacy," said Alan Holroyde, executive vice president of Wells Fargo's electronic commerce group. "Without that, not much progress will be made on the large-dollar side."

### Testing, testing

The banks' technology trial this spring will involve real customer accounts but not real money.

The banks will share information online via their PKI systems, which consist of certificate-issuance and management servers as well as certificate repositories that make use of the Lightweight Directory Access Protocol (LDAP).

Cautious and security-minded by trade, the banks already have noticed technical gaps that need to be filled to satisfy their business requirements.

"The problem with LDAP 2.0 is it doesn't even require a user name and password to get into it," Merritt pointed out.

LDAP 3.0 has improved security, but to retrieve information on a specific certificate holder — rather than a whole list of people — the banking industry is proposing a new technology called the Online Status-Checking Protocol. This protocol would become part of the IETF's Public-Key Infrastructure Exchange standard.

To facilitate routine fund transfer requests between themselves transacted over the Internet, the banks are developing a payment systems interface.

The banking industry also is grappling with the thorny question of who will be responsible for a payment transaction if things go wrong or fraud occurs.

A stolen certificate would be put on a revocation list, but it takes time to do that. The banks have decided at this point that the rightful certificate holder should not be held liable for the risk.

In the pilot, online merchants would be responsible for validating signatures via HTTP or e-mail. The vendors would manage certificate revocation lists for the banks. ■

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## Spectrum

*Continued from page 1*

help users bring up devices faster after network outages.

Usually, device configuration is a manual process that is time-consuming and error-prone. Alternatively, users can write script files to achieve some level of automation, but that, too, is time-intensive.

"In 5.0 I can say, 'Go out and verify all of the router configurations.' Under the current release I have to say, 'Go out and verify configuration for Router A, verify Router B,' etc.," said Michael O'Brien, senior systems management engineer at Winstar Communications, Inc., a Tysons Corner, Va.-based competitive local exchange carrier.

### Configuration issues

Bill Tracy, director of Spectrum product strategy, acknowledged that the configuration tool in current versions of Spectrum is "piecemeal."

"Now you can list [multiple devices] into a single configuration" with Spectrum 5.0, Tracy said.

"It avoids a lot of unnecessary traffic being run around the network and equipment being taken offline while [users] reload configurations," said Rick Sturm, principal of Enterprise Management Professional Services, Inc., a Boulder, Colo., network management consultancy.

"It gets you around the problem of having to use the individual vendor's element management systems to configure devices."

Cabletron's challenge, observers noted, will be to convince users with heavy installations of Cisco Systems, Inc. routers, 3Com Corp. switches and Bay Networks, Inc. hubs to manage those environments with Spectrum 5.0 and ECM.

ECM can be used with any SNMP-based device or server managed by Spectrum. It uses SNMP and other standard and vendor proprietary Management Information Base variables to configure devices.

From the ECM screen, a network manager can capture configurations by clicking on a device, which brings up a template. From this template, the manager can select specific device MIB and configuration attributes, save this data and then download it to multiple devices with a couple of mouse clicks.

For example, a manager can click on an icon representing Cisco routers to launch ECM. The manager can then change passwords and access control list information, save the edits and then download the file to scores of Cisco routers in one shot.

The other enhancements in Spectrum 5.0 include the Live Links application, which shows the status of network connections, now will show only relevant, instead of all, connections (see graphic).

### FEATURES OF SPECTRUM 5.0

- An Enterprise Configuration Manager that features automated device configuration
- Support for nonpersistant connections such as dial-backup lines
- An Alarm Manager that supports user profiles and sorts alarms by date, severity or model name
- An Event Browser that includes print function and search filters
- Increased performance to alleviate deployment of additional Spectrum servers

Spectrum 5.0 is expected to cost about $15,000, while the new version of ECM will cost $10,000 for a single server license and $7,500 for additional servers.

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## Novell

*Continued from page 1*

half-dozen partnerships with the likes of Hewlett-Packard Co., IBM and Sun Microsystems, Inc. under which these firms were to port NDS to run natively on their respective operating systems.

While Novell intends to continue to support these partnerships, officials appointed by turn-around CEO Eric Schmidt said they have misgivings about this old approach.

### CROSS-PLATFORM NDS GAINS

**So far, not so good**

| Platform | Vendor | Delivery date |
|---|---|---|
| Windows NT | Novell | Dec. 1997 |
| UnixWare | Santa Cruz Operation | Jan. 1996 |
| HP-UX | Hewlett-Packard | March 1997 |
| Solaris | Sun | No time frame |
| AIX | IBM | Mid-1998 |
| OS/390 | IBM | Nov. 1998 |
| DS/90 Unix | Fujitsu | No time frame |

"I can spend all of my resources [trying to get partners to port] NDS to these garden flavor varieties of Unix, but that would be a waste of time," said Chris Stone, Novell vice president of strategy.

"Yes, I guess you would have to say that [this approach] didn't work. We threw a party and not many people came," said A. J. Dennis, a Novell corporate strategist under John Slitz, newly appointed Novell marketing head.

HP and The Santa Cruz Operation, Inc. are the only licensees that currently bundle NDS with their Unix offerings. Despite licensing the NDS code last July, IBM is not expected to ship NDS on either AIX or OS/390 until later this year.

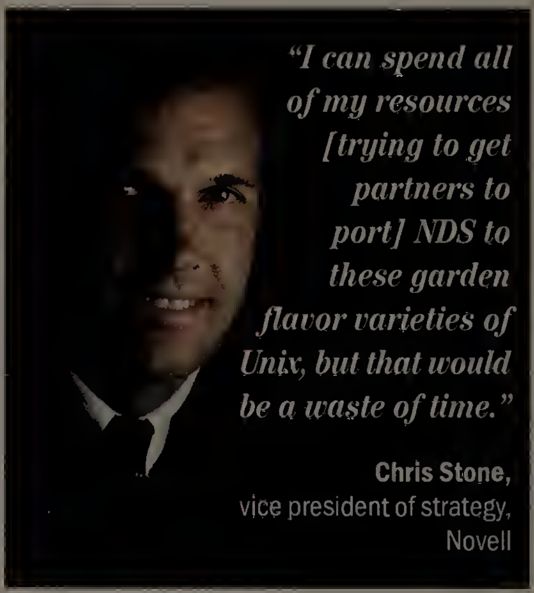
Fujitsu, Ltd. and Sun also have licensed the directory code but have not committed to delivery dates. In fact, industry analysts doubt Sun ever will ship NDS for Solaris, because the company recently shipped its own directory service.

"The commitment of these third parties to push NDS is just not there," said Neil MacDonald, an analyst with Gartner Group, Inc., in Stamford, Conn. "If there was real support behind these deals, you would have seen both product and corporate deployment by now."

But despite the lack of movement from Novell's partners, Stone said users still want a simple way to weave Unix boxes into their Novell nets.

In all likelihood, Novell will build and market these NDS authentication modules on its own. But officials would not say if these modules would be sold as stand-alone products or be rolled into future versions of NetWare or NDS. They would not give a time frame for delivery.

Kansas City, Mo.-based Hallmark, Inc. said it would be interested in single sign-on capability for its 60 NetWare 4.X network and various Unix application servers. But Hallmark was put off by the original vision because the cardmaker uses too many flavors of Unix, said technical analyst Dan Blevins. "Managing all of those separate NDS host machines would have been too complicated."



*"I can spend all of my resources [trying to get partners to port] NDS to these garden flavor varieties of Unix, but that would be a waste of time."*

**Chris Stone,**
vice president of strategy,
Novell

Novell's authentication-module approach has worked in the past, said Michael Simpson, director of product marketing for Novell's Network Services Division. Novell shipped a redirection module for Windows NT servers in early 1997 as part of a two-phase NT and NDS integration plan. This module, called Novell Administrator for NT, gave customers single sign-on capability and centralized user account administration for mixed NT and NetWare nets.

It wasn't until Novell released NDS for NT last December that the directory ran natively on top of the operating system.

"No, you don't need native NDS support for single sign-on. But there still is some value in having it there," said Simpson.

Specifically, native NDS is useful in remote offices where companies don't want to deploy multiple operating systems and for running new cross-platform, directory-enabled applications. ■

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## Java

*Continued from page 1*

"write once, run anywhere" potential, many are leery of deploying sluggish applications that bog down their networks.

"But enterprises are growing impatient waiting for the language to mature," said Ron Rappaport, an analyst at Zona Research, Inc., of Redwood City, Calif.

One solution vendors are pursuing is to create native compilers that improve the performance of Java applications on specific platforms; this differs from HotSpot, which will run on any Java-enabled platform.

For example, Tower Technology, of Austin, Texas, plans to debut "dynamic native compiler technology," designed for platform-specific server-side Java applications at next month's Java-One conference. The company's existing TowerJ 1.0 tool takes a developer's source code and compiles it for a platform, similar to the way programs are written and compiled in C or C++.

In contrast, TowerJ 2.0 is designed to boost the pool of Java applications based on byte code, which is inherently multiplatform. Byte code, compiled from Java source code, can be interpreted and run by a number of Java-based systems, such as Web browsers and network computers. Tower officials claim benchmark tests show that the company's TowerJ source code compiler and its new TowerJ 2.0 byte-code compiler can execute Java applications as fast as those written in C++.

IBM is developing similar software. The company's High Performance Compiler for Java compiles Java byte code into optimized platform-specific native object-oriented code.

### Java speed solutions

**There are several technologies available to improve the performance of Java applications, according to vendors and analysts.**

- **Just-In-time (JIT) compilers:** Included in Java Virtual Machines, JITs are programs that turn Java bytecode into instructions which are sent directly to processors as the application is running. Vendors selling JIT compilers include Symantec and Asymetrix.
- **HotSpot:** JavaSoft's virtual machine that some say will double the speed of Java applications. It is touted as more powerful than standard JITs. An early release is available to Java licensees.
- **TowerJ 2.0:** Slated for final release in late March at JavaOne, this technology differs from JITs and HotSpot by optimizing the application before it is deployed.

IBM is now beta-testing the compiler, which the company claims is more effective than the just-in-time (JIT) compilers found in Java Virtual Machines.

Sun's weapon of choice to eliminate the Java speed problem is HotSpot. To meet its portability mandate, Java software is distributed in an intermediate language — byte code — that is translated for any platform "on the fly" by a Java Virtual Machine. However, this translation process hinders performance. To combat this problem, HotSpot finds the parts of an application that can be accelerated and makes them run faster.

But HotSpot has been beset by delays. Originally slated to ship last summer, the final version of HotSpot is now due to be released this summer.

A JavaSoft engineer working on HotSpot said that despite some criticism, the company has resisted rushing the software out the door.

"A virtual machine implementation is one of those 'no wine before its time' situations," said Tim Lindholm, a JavaSoft senior staff engineer. "It would not serve anybody for us to ship something that was going to be flaky."

But not everyone believes HotSpot will be a magic bullet. "HotSpot is trying to take JIT technology, which reads byte code on the fly and processes it, and keep looking at ways to make that faster. And you can only go so far," said Madison Cloutier, Tower's vice president of marketing.

Cloutier said TowerJ's advantage is that it optimizes languages statically — that is, before the application is deployed.

"TowerJ can hot-start applications. When you initiate execution, it's going to start running at full speed because it's already been optimized," Cloutier said. "With HotSpot, the application will start off cold and then dynamically adapt itself and get faster as it locates the 'hot spots.'"

JavaSoft's Lindholm disagreed that the static model makes TowerJ superior to HotSpot. "If their issue is static vs. dynamic, we think static is going to lose," he said.

"The reason HotSpot is interesting is because of all the run-time information it gathers. If they're going to try to do their optimization up front, they can't do that. Furthermore, HotSpot can continually make adjustments as an application runs."

TowerJ 2.0 will run on a number of platforms, including SPARC Solaris, Windows NT, HP/UX and IBM AIX.

IBM's High Performance Compiler for Java runs on AIX 4.1.3, OS/2 Warp 4, Windows 95 and NT (3.5.1 and 4.0). An IBM official said the compiler will be released this summer. ■

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Backspin

# Drink coffee, stay up late, build a world

*"God didn't create the world in seven days. He goofed off for six, then pulled an all-nighter."*

— Anon.

Here at the Gibbs Institute of Cosmology and Ontology we're staying up late. Very late. Lucky fellows that we are, we've been playing around with some software that builds what you might call a "world."

Mark Gibbs

It all started when I needed to create a logo for a seminar series that I'm hosting for a client. Because the theme of the seminars is mapping out electronic commerce, I thought it would be a nice touch to have some kind of graphic of a map. From there, it wasn't much of a leap to deciding that an animated map would be much cooler.

I've done a bit of this kind of work before using Asymmetrix 3DFX and got some pleasing results. If you haven't come across this tool, it is one of the easiest ways to create flying, spinning and generally athletic logos, text and other objects with lighting, textures, shadows and so on.

But this time I wanted more. I wanted a map that folds and unfolds. My choices were MetaCreations' Bryce 3D or Macromedia's Extreme 3D 2.

Bryce 3D is awesome. You can create virtual landscapes complete with mountains, moving water, moving clouds, a rising and setting sun and moon, meteors and mist. You can add almost any kind of 3-D object with full shading, texturing and bumps, and then animate it so it can move in the virtual world you create. The object's shape also can deform and transform as it goes. The result is a movie, and the output is more or less professional level.

One of the many cool things about Bryce is its user interface. It is not primarily a Windows interface. Kai Krause, the guy who became famous for Kai's Power Tools, Power Goo and other amazing graphics software, had a hand in the design. And as with all tools that Kai has anything to do with, Bryce 3D is different.

I won't try to explain what the interface is like because I couldn't do it justice — it's one of those things you can't understand unless you try it — and I'd run out of space trying to do so. Suffice it to say, you should check this product out.

Of course, as with any powerful tool, it takes a lot of experimenting to get anything out of it and, being pressed for time, I decided to try Extreme 3D 2. Extreme is not that much simpler, so it was four hours before I got anything approximating the animation I wanted. That said, I rate Extreme very high, a pleasure to work with and amazingly powerful.

What really gets you when you work with these tools is how addictive the development process is. It's the same kind of high you get when programming — that "I can't stop, don't bug me, I'm on a mission, where's my coffee, cola and Twinkies" kind of obsessional high that keeps you up until, let me check my watch, yep, it is indeed 4 a.m.

I used to get that way in my FORTRAN and C coding days and when drafting in my architecture school era. For nearly a decade now it has been writing, researching and reviewing network software that has done the same thing for me.

But this world-building stuff is just a blast. If you're of the turn of mind that likes the creative process and haven't tried these 3-D packages, you have a treat in store.

And with the kind of results you can get for not too much effort, there's a real business reason to try them out. Just think about how much more effective it would be to animate the thing you're talking about in 3-D rather than use a dry PowerPoint presentation.

Well, it's now around 4:30 a.m., and I know I can get this animation finished real quick. I wonder if there's any coffee left?

*Share your world-building plans with me at nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.*

# 'NET BUZZ

**The latest on the Internet/intranet industry**

*By Chris Nerney*

**REMOTE RAKES IN THE CASH** One of the technologies that attracted the most venture capital last year was remote access (*NW,* Nov. 24, 1997, page 8.) You can expect that to continue this year.

The latest remote access start-up to score a big venture round is **Aptis Communications, Inc.,** which just closed a $10.5 million deal with several investors.

Last December, Aptis unveiled a network switch that allows carriers and Internet service providers to handle the large volume of traffic generated by the growth of corporate intranets, extranets and virtual private networks. **UUNET** currently is a beta customer. A final release of the product, the CVX 1800, is scheduled for the end of May.

Second-round investors include **Bessemer Venture Partners, Charles River Ventures** and **Morgenthaler Ventures,** all first-round participants, and **JAFCO,** an Asian investor.

The new financing brings total capital invested in the start-up to $16 million since its inception in January 1997. Aptis is based in Chelmsford, Mass.

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**JAVA DEVELOPER GRABS INITIAL VENTURE FUNDING** **Athena Design,** an early developer of Java application server component software, just completed a round of venture funding from **Brushfire LLC** of New York.

The amount of the funding was not disclosed.

Formed in 1992, Athena, based in San Francisco, specializes in component technology that enables developers to integrate spreadsheet functions into Java server applications.

Athena announced a JavaBean component for spreadsheets, called Integer, at the Java Internet Business Expo last September.

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**STAR STRUCK IN CYBERSPACE** What do **President Clinton, Pamela Anderson** and **Madonna** have in common? Hey, get your mind out of the gutter! It's not what you think. At least, nothing that's been confirmed. (Not that *that* matters anymore.)

The trio is at the top of **Web21's** list of the most-mentioned celebrities on the Internet for the past week.

Web21 is a Palo Alto, Calif.-based firm that analyzes Web traffic to determine the hottest Web sites in a number of categories, including entertainment, business, technology and lifestyles. The company sells customized research reports to clients.

Clinton tops the list, with 5,131 mentions, followed by Anderson with 4,987 and Madonna at 4,858.

There's a big dropoff from there to No. 4 **Cindy Crawford,** who had 2,686 mentions. Rounding out the top 10 (in order) are **Michael Jordan, Bill Gates, Princess Diana, Demi Moore, Gillian Anderson** and **Sandra Bullock.**

Gates, by the way, is the only high tech or business person on the list.

And despite all her hard work, **Monica Lewinsky** only made it to No. 33. Geez, what do you have to do to attract attention on the **World Wide Web,** anyway?

The full list can be found at www.100hot.com/star/fullscreen.html.

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**YET MORE EVIDENCE OF THE SUPERIOR EUROPEAN CULTURE** Though we admit the photo was funny, *'Net Buzz* strongly condemns the cream pie attack on **Bill Gates** in Brussels, Belgium, last week.

APTV

The incident bothers us on several levels. First off, we find disquieting the notion that you can be the Richest Man in the World, yet still get hit in the face with a pie at any moment. You'd think $36 billion would buy you some kind of comfort zone.

Second, four or five people were involved in the incident, leading some to believe it was a plot hatched in an Internet chat room. If so, this would reflect poorly on all 'Netizens and could trigger a crackdown by a secret **Microsoft** antiterrorism unit.

Third, while Gates may be vilified for his aggressive business practices — and we certainly get in our verbal digs — he doesn't deserve to be assaulted.

But the photo was funny.

*It takes more than a pie to silence 'Net Buzz, so until someone ups the ante, we will continue to exercise our First Amendment rights by reporting your best Internet- and intranet-related news. Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.*

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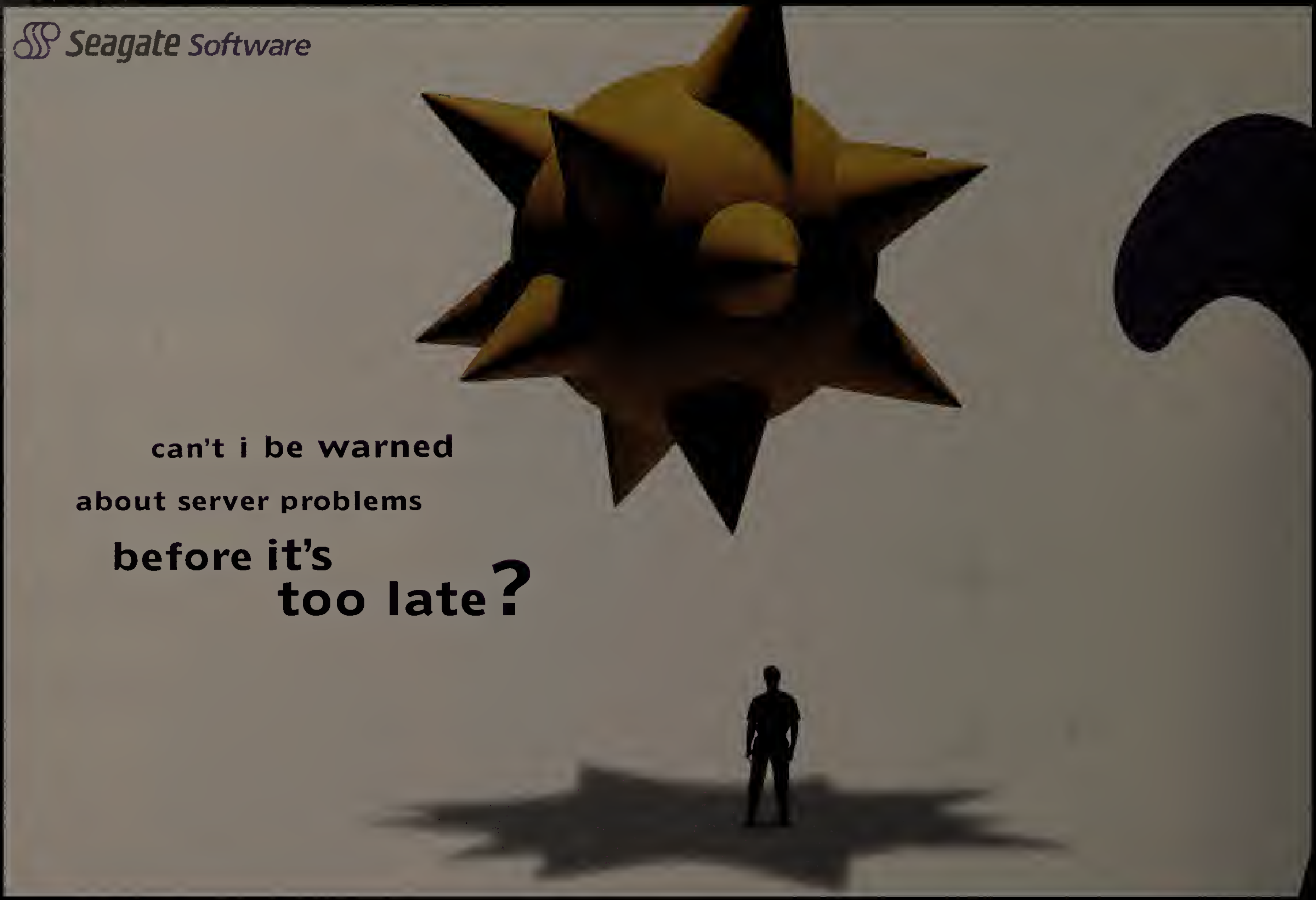

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